### Energy Management Training for K-12 Schools

Workshop #3: Utility Tracking and Bill Analysis

A Tele-Workshop brought to you by:

Colorado Governor's Office of

Energy Management and Conservation

November 30, 2006











### Rebuild Colorado Call Us When You...

- ✓ Are strategizing to upgrade your buildings
- **✓** Are planning a new building
- ✓ Are developing projects for capital improvement budgets (internal funds, bonds or grants)
- **✓** Want to use energy savings to pay for projects
- ✓ Want to bring energy costs under control
- ✓ Want to improve comfort and solve maintenance problems





www.colorado.gov/rebuildco

Governor's Office of Energy

Management and Conservation

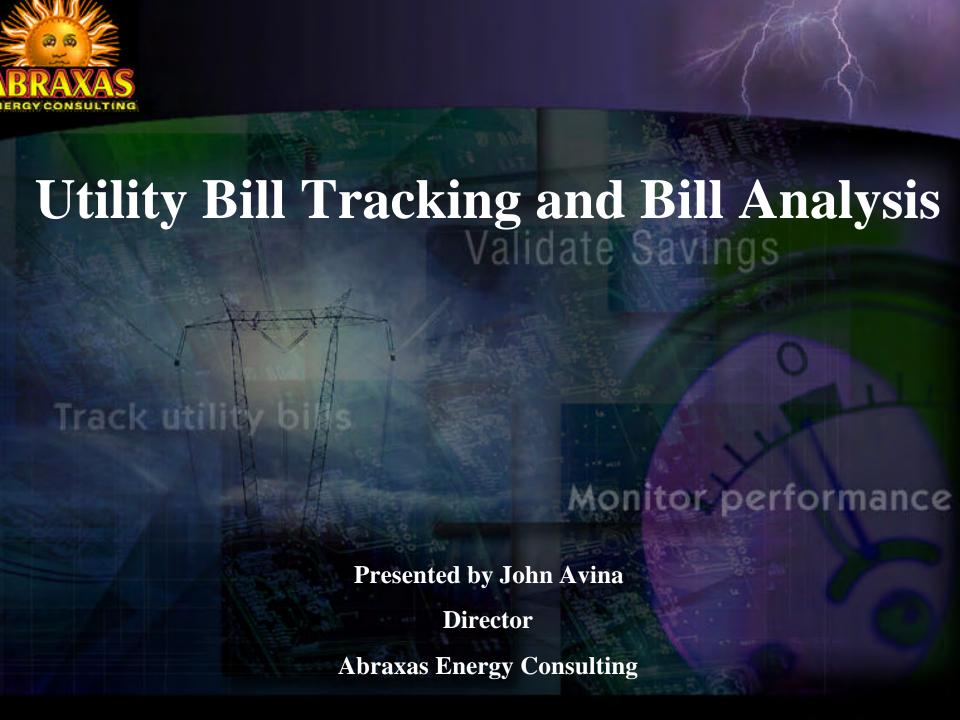
#### Your Rebuild Colorado School Team

Linda Smith, OEMC Senior Program Manager John Canfield, Schools Coordinator (303) 247-0193 Peter D'Antonio, Schools Energy Manager (303) 678-1108 Rob Pearson, OEMC Project Assistant Gwendolyn Ruffin, OEMC Program Assistant

Rebuild Colorado helps schools identify and assess energy-saving projects in buildings, and helps make those projects a reality!









Why Utility Tracking

Some Utility Bill Analysis Tricks

Should You Use Spreadsheets of Specialized Software

Selecting a Utility Bill Tracking Program

Setting Up a Successful Utility Bill Tracking Program.



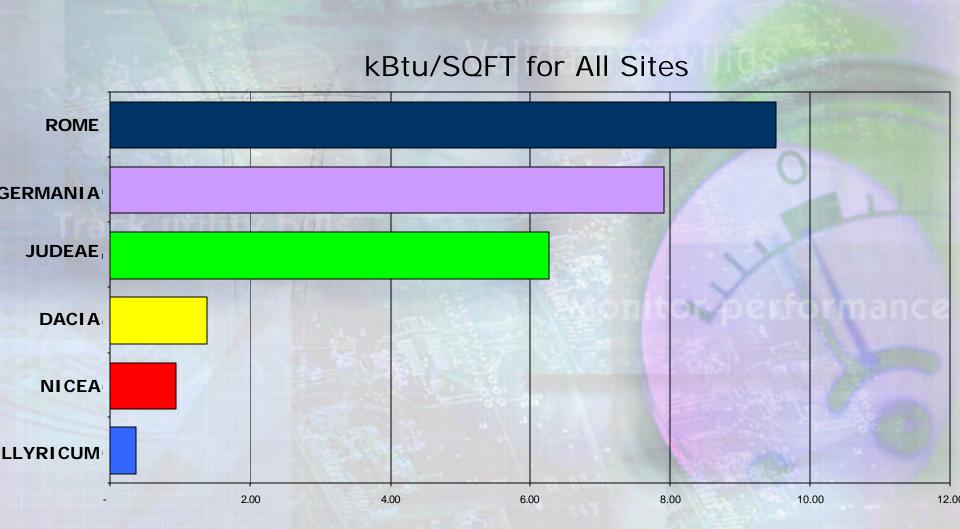
### Why Utility Bills

- You Need to Make Good Energy Management Decisions.
- You Must Continually Impress Management or Lose their Confidence (and Future Funding for Your Projects).
- Your Energy Management Recommendations Must be Right On!
- You need to wring as much savings as you can with as little capital as possible.
- You Need a Way to Show Management the Good Job you are doing in a way they can understand.



# To Make Good Decisions You need to know

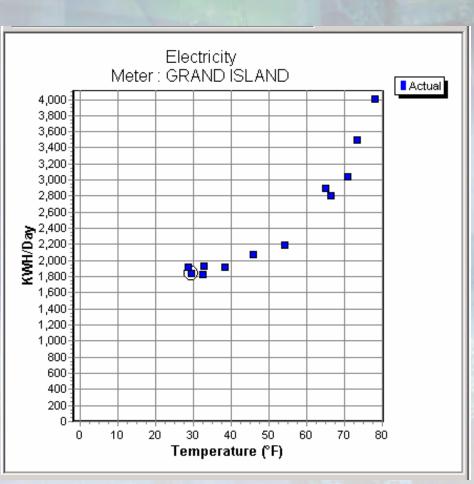
#### Which Buil dings are using too much energy

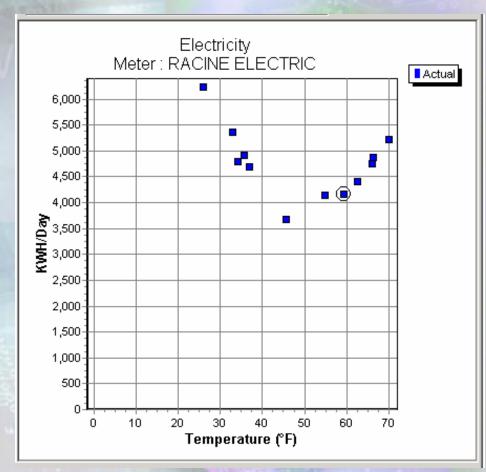




# To Make Good Decisions You need to know

#### If & How Weather Affects each building





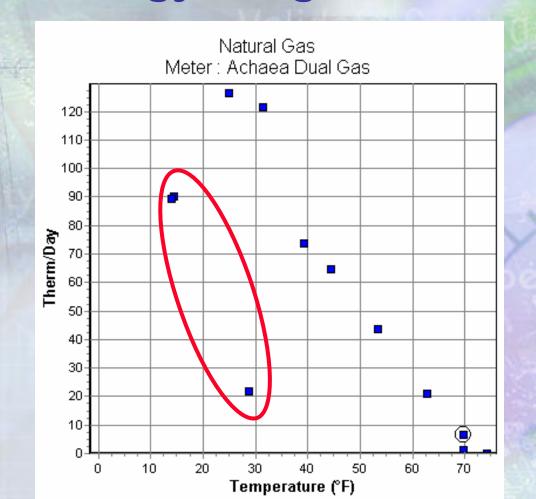
Electric used to Cool Only

Electric used to Heat & Cool



# To Make Good Decisions You need to know

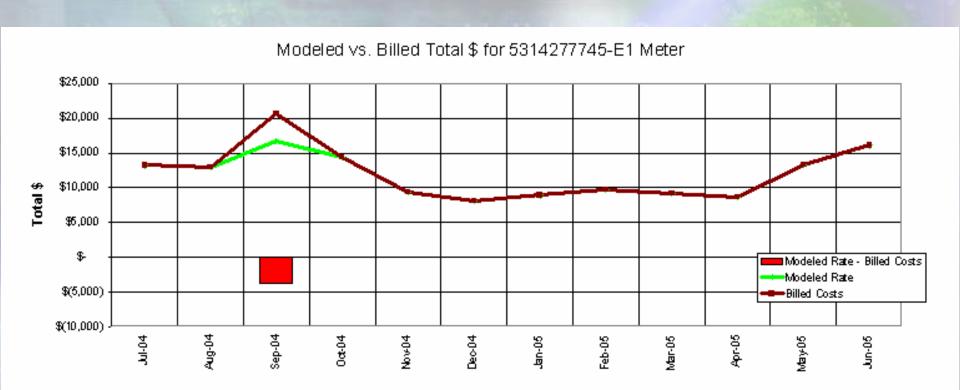
### When there are I arge unexplained changes in Energy Usage Patterns





# To Make Good Decisions You need to know

#### Whether there are billing discrepancies

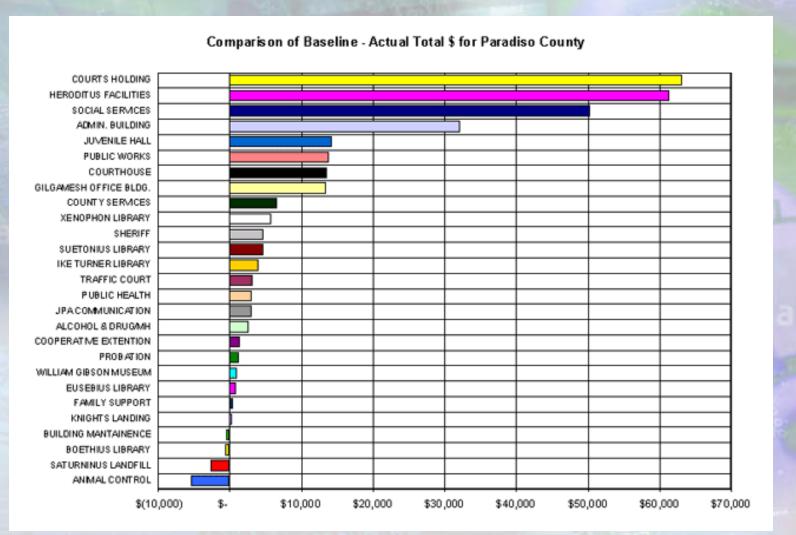


Year Ending 6,80,05																									
Scenario	Jul-04		Aug-04		Sep-04		Oct-04		Nov-04		Dec-04		Jan-05		Feb-05		Mar-05		Apr-05		May-05		Jun-05		Total
Modeled Rate	\$ 13,246	\$	12,935	\$	16,739	\$	14,392	\$	9,321	\$	8,123	\$	8,923	\$	9,732	\$	9,197	\$	8,618	\$	13,347	\$	16,103	\$	140,677
Billed Costs	\$ 13,246	\$	12,935	\$	20,606	\$	14,392	\$	9,321	\$	8,123	\$	8,923	\$	9,732	\$	9,197	\$	8,618	\$	13,347	\$	16,103	_	144,544
Modeled Rale - Billed Costs	\$	\$	-	\$	(3,867)	-\$	-	\$	-	\$		\$		\$		\$	-	\$		\$	-	\$	-	\$(	(3,866.71)
Percent Difference					23.1%																				-2.7%



# To Make Good Decisions You need to know

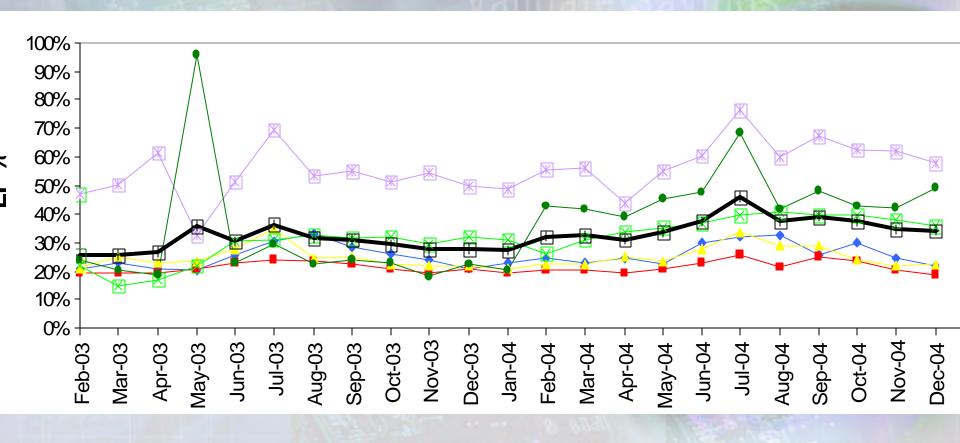
#### Which Buil dings are saving energy





## To Make Good Decisions You need to know

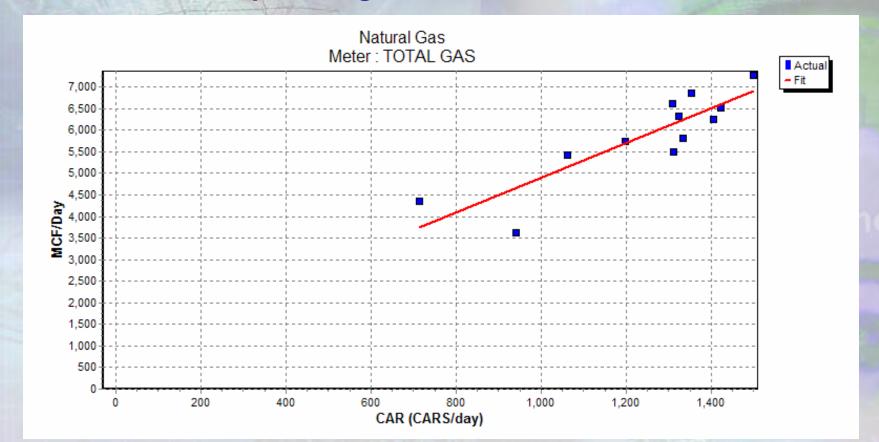
### Which Buil dings Not Turning Off Their Equipment at Night





## To Make Good Decisions You need to know

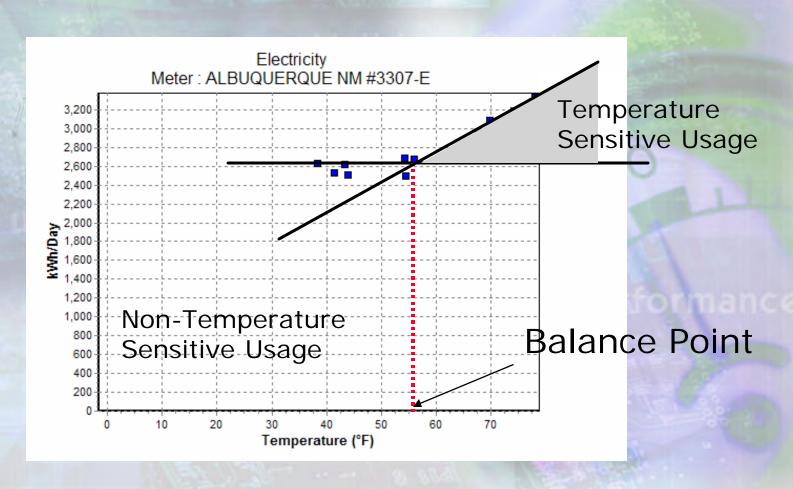
f there a predictable relationship between energy usage and production (or Occupancy or other variables)





# To Make Good Decisions You need to

#### **Understand Your Energy Usage Patterns**





### Present Your Results

#### ... in a way management can understand





# Benchmarking Load Factor Analysis Weather Normalization



### Benchmarking





### Common Benchmarking Measures

Need some measure that is relevant from building to building

\$/SQFT/Year:

works as long as all buildings are in same utility service territory, are same building type and have same weather.

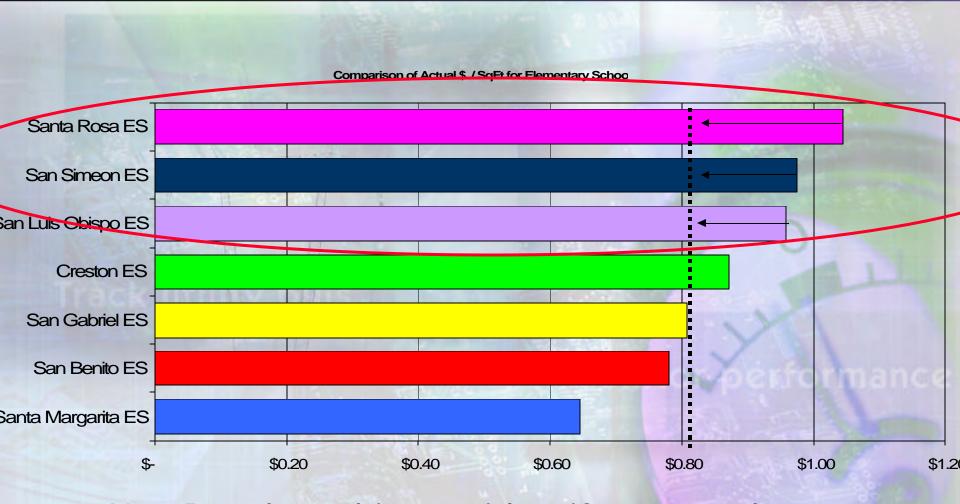
Energy Use Index (EUI)

[kWh/SQFT/Year] or [kBtu/SQFT/Year]

Works as long as all buildings have the same weather and are same building type



### Benchmarking



Use Benchmarking to identify energy hogs.
Use Benchmarking to set reasonable targets.



### Why Benchmarking

To find out how well your facility compares to similar facilities.

To determine upon which of your buildings you need to concentrate your efforts.

To set Targets for your buildings

Benchmark IS NOT the same as Baseline!



### Jargon: Benchmark vs. Baseline

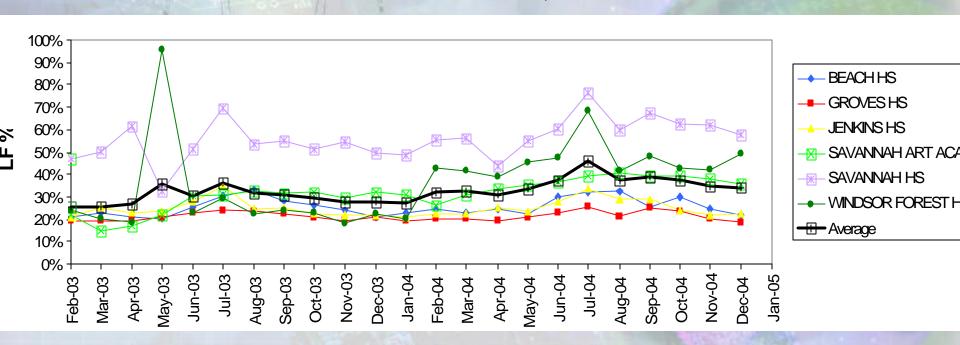
Benchmark – A comparison your facility to like facilities to see how efficient your facility is

Baseline – How much energy your facility would have used this year, based upon prior year usage patterns and current year weather conditions.

(We will cover this later.)



$$LF = \frac{kW_{ave}}{kW_{mtr}} = \frac{kWh}{kW_{mtr} * N_{days} * 24} \frac{hrs}{day}$$



oad Factor is a measure of demand relative to usage...



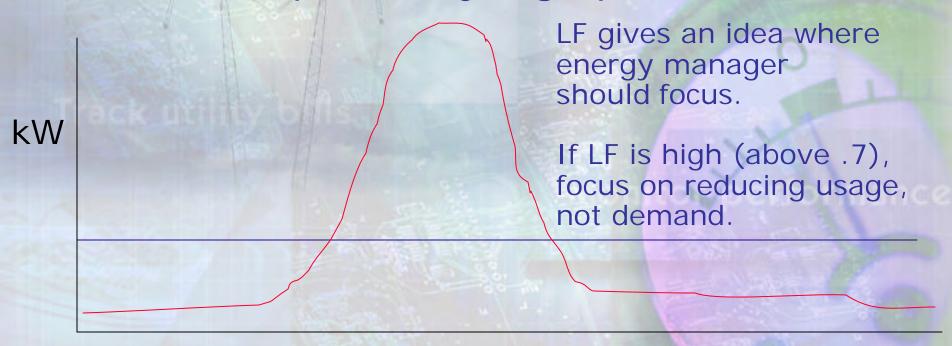
$$kW_{ave} = kWh / (kW_{mtr} * N_{days} * 24 \frac{hrs}{day})$$

$$kW_{ave} = kWh / (N_{days} * 24 \frac{hrs}{day})$$



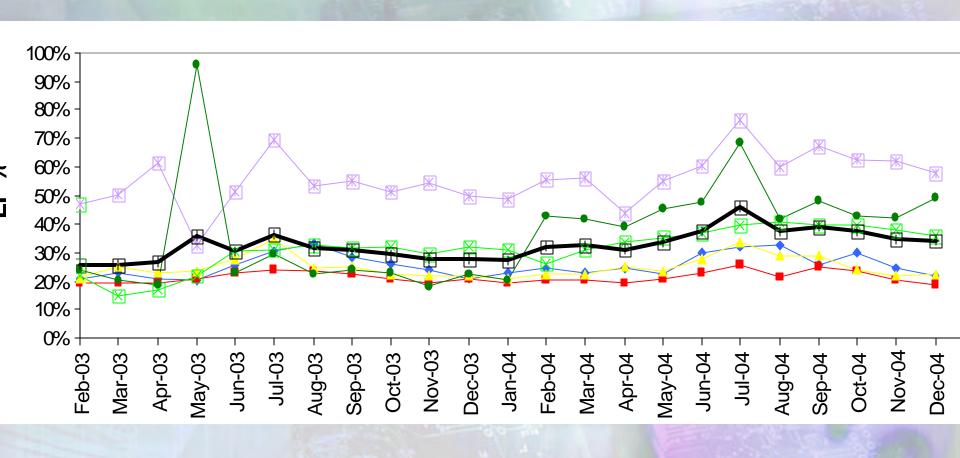
LF = 1 implies uniform levels of use (no high peak demand)

LF ~ 0.2 implies very high peak demands



Hour of the Day

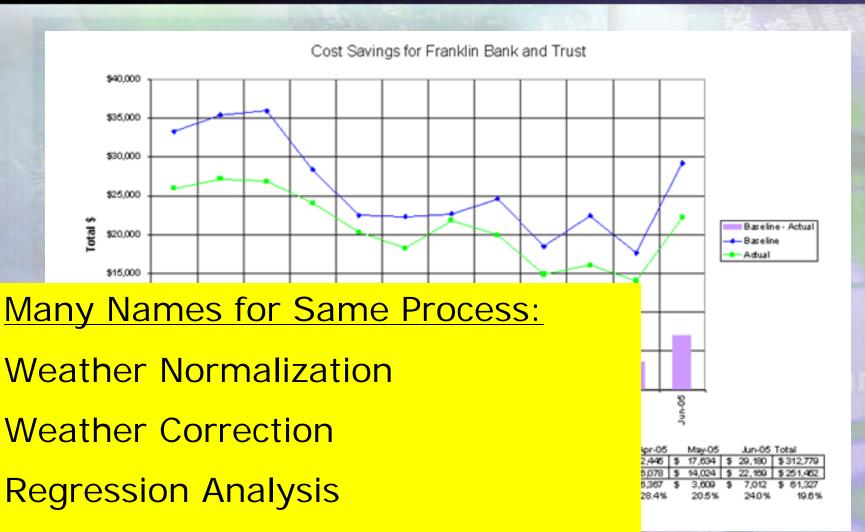






Tuning Bills to Weather

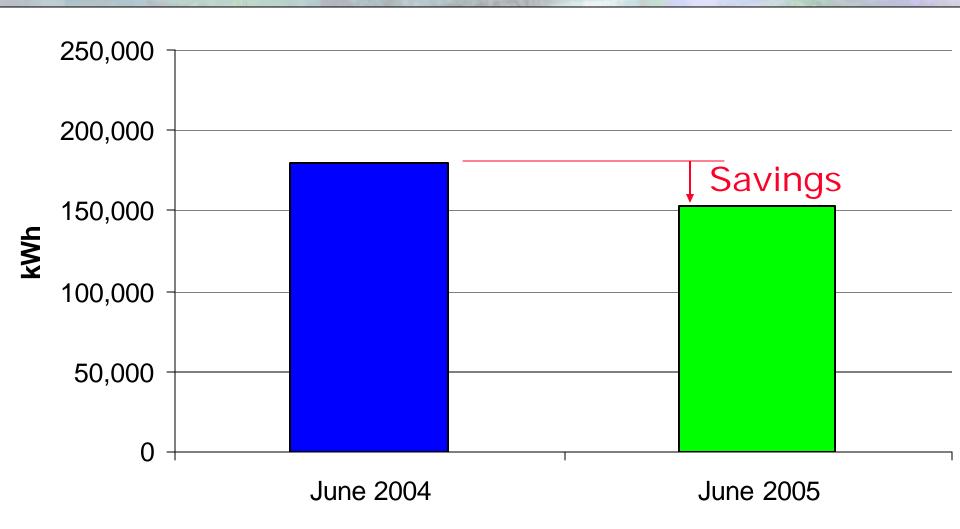
### Weather Normalization





### Al ways Yield Savings

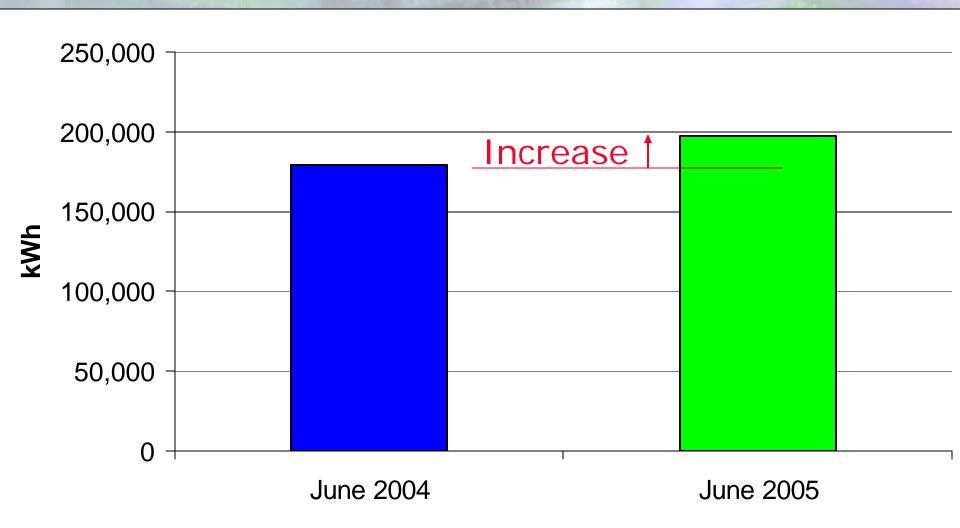
Suppose I expected this from my Lighting Retrofit....





### Al ways Yiel d Savings

#### ...and instead got this....







Why Don't I

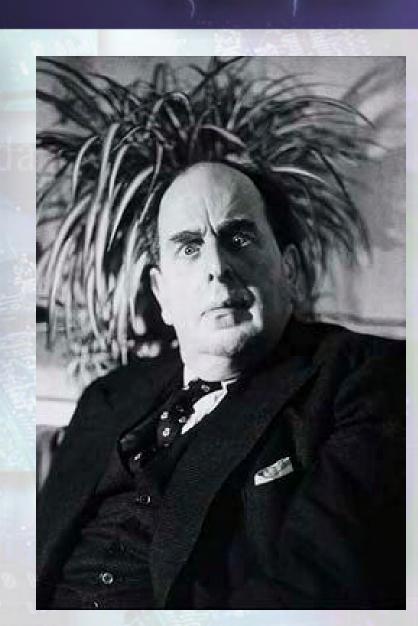
Show Savings?

What Do I

Tell Management?

Will They Fund

My Neyt Project?





### Justifying Your Existence

# How Can You Show Savings This Year?

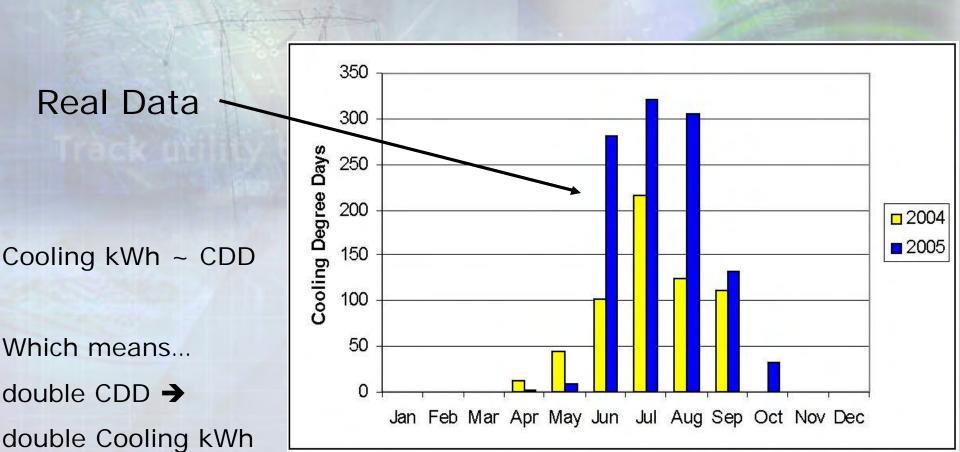
Detroit, meanwhile, continues to bask in its hottest summer in more than a century of record-keeping, with 18 days at 90 or above, compared to the usual 12, and an average temperature of 74.8 degrees compared to the normal 71.4.

The previous hottest summer on record was 1995, which averaged 74.5.



### Justifying Your Existence

# How Can You Show Savings This Year?





# How To Perform Weather Correction

#### Pick Your Base Year

Pick a Pre-Retrofit Year, or

the Year before you start your Energy Management Program, or

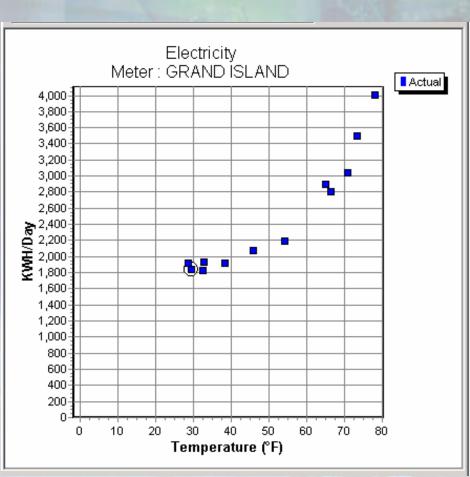
Some other Period

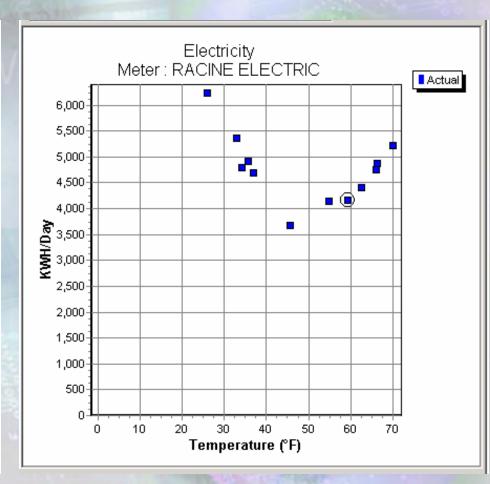
12 Months? 24 Months? Does it Matter?



# How To Perform Weather Correction

#### Determine How Bills Vary with Weather





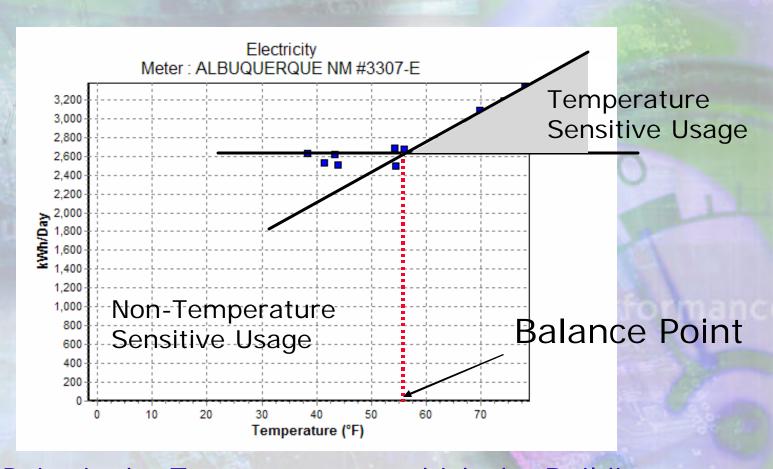
Electric used to Cool Only

Electric used to Heat & Cool



# How To Do Perform Weather Correction

#### **Estimate Balance Point**



Balance Point is the Temperature at which the Building Starts to Cool.

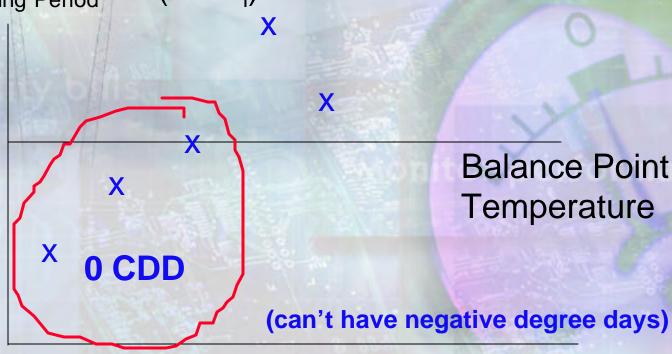


# How To Perform Weather Correction

#### Cal cul ate Degree Days

- 1. For each day in Billing period...
  - CDD<sub>i</sub>=(Ave Outside Temp Bal Point Temp) X 1day +
- 2.  $CDD_{Billing Period} = \Sigma(CDD_i)$

Average
Daily Outside
Temperature

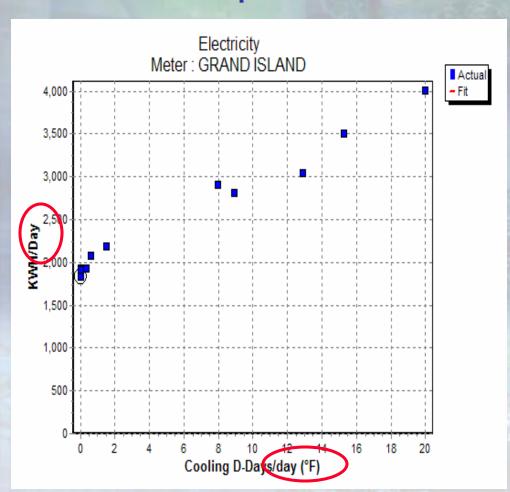


Time in Days



# How To Do Perform Weather Correction

#### Graph Bills Vs. Degree Days

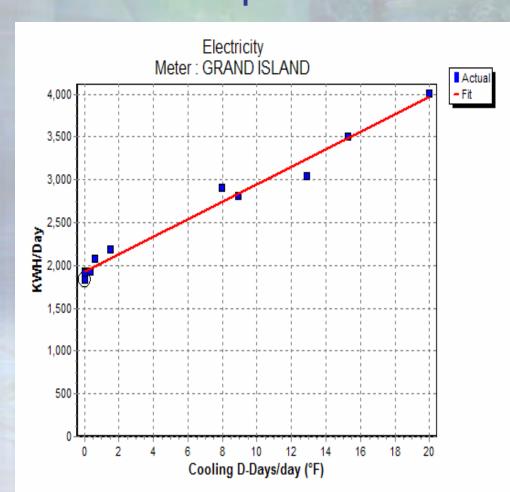


Normalize by #Days



# How To Do Perform Weather Correction

#### Graph Bills Vs. Degree Days



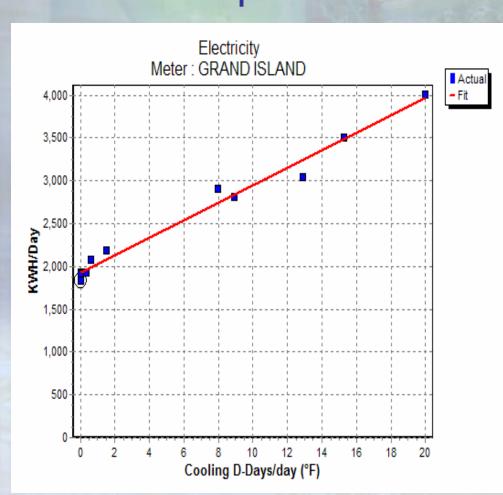
Find Best Fit Line

The Best Fit Line
Represents the Base
Year Bills



# How To Do Perform Weather Correction

#### Graph Bills Vs. Degree Days



• Ensure the Fit is Acceptable

Statistical Indicators

CVRMSE 2.84 ✓

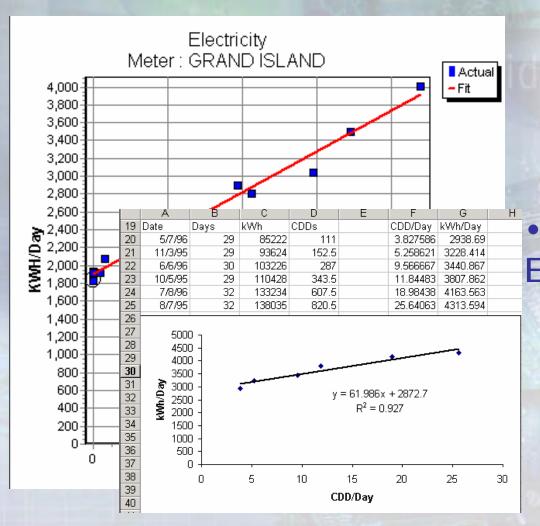
R² 0.981 ✓

Bias (%) 0.000 ✓



# How To Perform Weather Correction

#### Graph Bills Vs. Degree Days



 Be Sure Fit is Good Enough

Statistical Indicators

CVRMSE 2.84 ✓

R² 0.981 ✓

Bias (%) 0.000 ✓



# Understanding the Basel ine

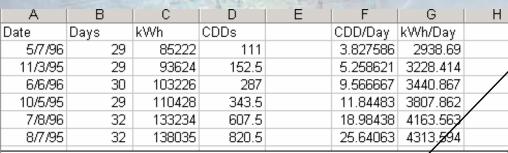
You Have Now Established Your Baseline What Does it Mean?

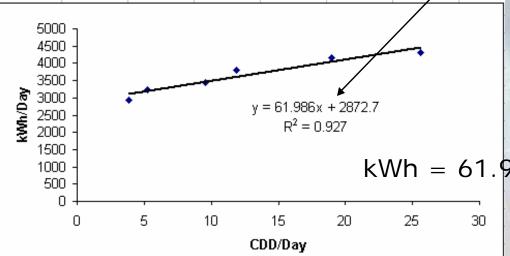




## Understanding the Basel ine

## Your Fit Line Has an Equation, which is called the Baseline Equation





$$y = mx + b$$

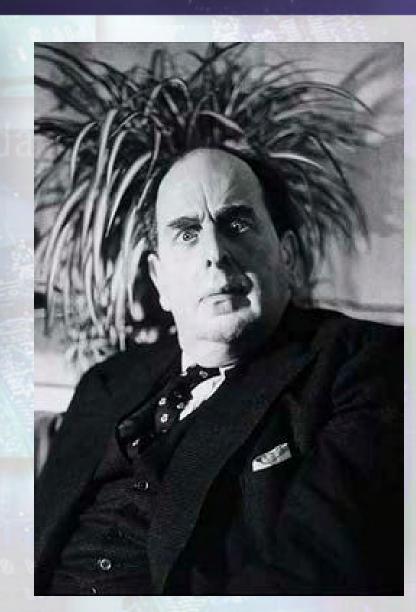
which could be rephrased into something like this

$$kWh = 61.986 \times \#CDD + 2872.7 \times \# days$$



## Wait a Second

You don't have to do all this math!

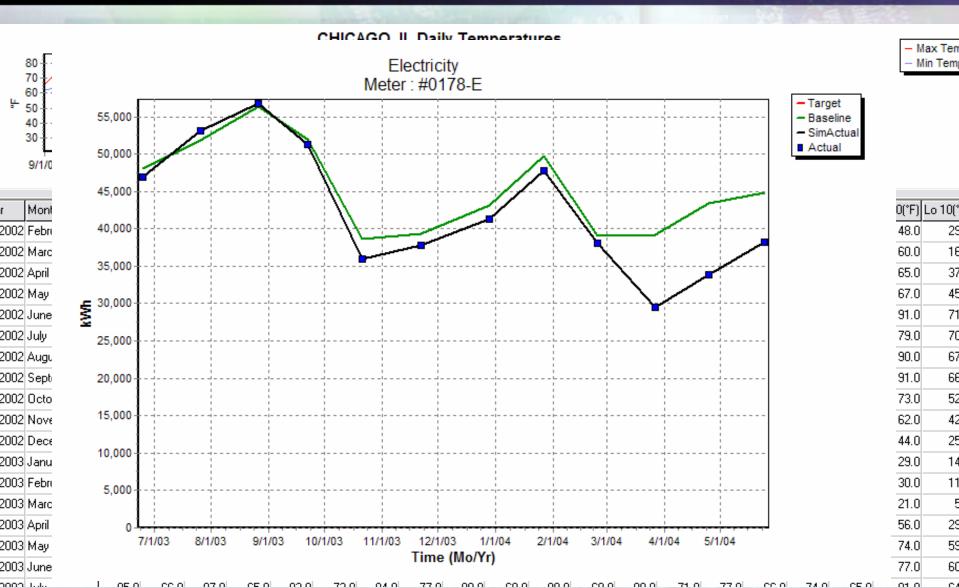




#### Wait a Second

Max Ten

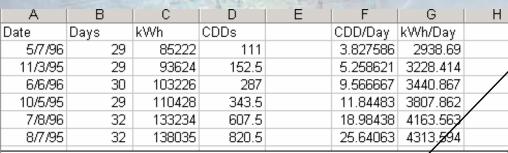
Min Tem

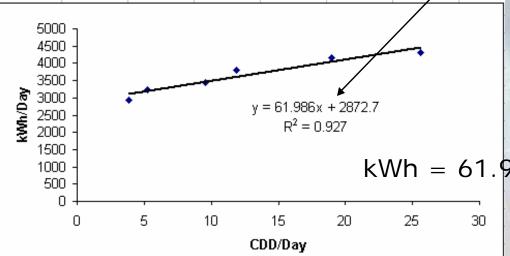




## Understanding the Basel ine

## Your Fit Line Has an Equation, which is called the Baseline Equation





$$y = mx + b$$

which could be rephrased into something like this

$$kWh = 61.986 \times \#CDD + 2872.7 \times \# days$$



## Understanding the Basel ine

## Your Fit Line Has an Equation, which is called the Baseline Equation

Baseline Equation = Best Fit Line ~ Base Year Bills

So now we can work with the Baseline Equation and throw out the bills. We don't need them any more.

Baseline Equation Represents your energy usage patterns during your Base Year



## Understanding the Basel in 6

#### What Good is the Equation?

- ·We take a Current Year Bill,
- determine # of days in the bill,
- determine # of CDD (or HDD)
- and plug those into the Baseline Equation.

```
Baseline kWh = 61.986 \times \#CDD + 2872.7 \times \# days
Baseline kWh = (61.986 \times 700) + (2872.7 \times 30)
```

Baseline kWh = 129,571 kWh

#### 7/21/05 Bill

100,000 kWh

700 CDD

30 days



## Understanding the Basel ine

#### What Good is the Equation?

So Baseline kWh represents how much energy your facility would have used in the Current Year given Base Year usage patterns and current weather conditions.

The Baseline Equation represents Base Year Usage patterns, and we applied Current Year weather to it.

Baseline kWh = 61.986 x #CDD + 2872.7 x # days

Baseline kWh =  $(61.986 \times 700) + (2872.7 \times 30)$ 

Baseline kWh = 129,571 kWh

7/21/05 Bill

100,000 kWh

700 CDD

30 days



### Understanding the Basel ine

#### What Good is the Equation?

Savings is Baseline Usage - the Actual Bill Usage

```
Baseline kWh = 61.986 \times \#CDD + 2872.7 \times \# days
```

Baseline kWh =  $(61.986 \times 700) + (2872.7 \times 30)$ 

Baseline kWh = 129,571 kWh

Savings = Baseline kWh - Actual kWh

Savings = 129,571 kWh - 100,000 kWh

Savings = 29,571 kWh

7/21/05 Bill

100,000 kWh

700 CDD

30 days



# Understanding the Basel in

#### Review

- . We Chose a Base Year
- 2. We Graphed Base Year Bills Against Weather
- We Found the Best Fit Line
- . The Best Fit Line Represents the Base Year Bills
- The Best Fit Line Has an Equation, The Basel ine Equation.
- The Basel ine Equation Represents the Best Fit Line which Represents Base Year Bills
- We Took a Current Year Bill
- B. Plugged CDD and #Days from the Current Bill into the Baseline Equation to Get Baseline Usage.
- Basel ine Usage is "How Much Energy We Would Have Used Given Base Year Energy Usage Patterns and Current Weather Conditions"
- O. Savings is Basel ine Actual Usage
- 1. Or How Much We Would Have Used How Much We Did Use



#### Utility Bills Analysis Leads to Good Energy Management Decisions

- Benchmarking to find Energy Hogs and set Targets
- Load Factor Analysis to determine if you should work on energy or demand
- Weather Correction to track utility savings and trends without interference with Production or Weather

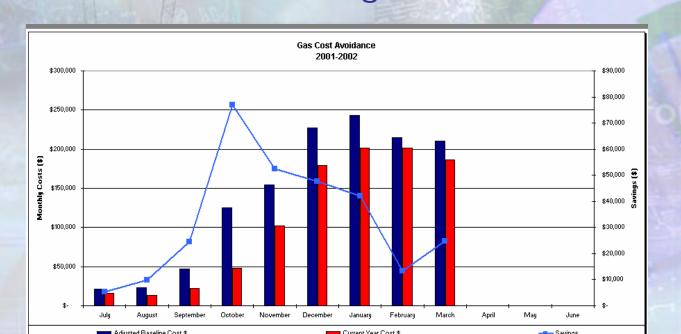
It's Easy: Enter Bills, Make Reports, Make Decisions



### Why Not Just Use Excel®

#### Positives:

Inexpensive
Get exactly what you want
Easy to understand (for author)
No training necessary
You can even do weather regression in Excel





### Why Not Just Use Excel®

#### **Negatives:**

- Can get complex
- Bugs may remain hidden
- Questionable savings calcs
- Hard to understand (for everyone else)
- When tracking savings, best to use standard method and canned software



## Why Not Just Use Excel®

It really comes down to....

**How Many Meters** 

How Sophisticated is Your Analysis



## Selecting the Right Software

Before Purchasing Software, Answer these questions:



- What do you want the software to do?
- Who is going to use it?
- How much is your budget?



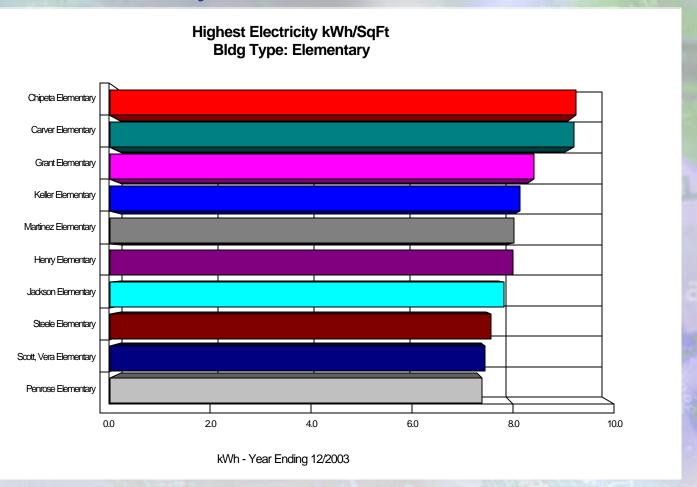
## Selecting the Best Software

#### What Capabilities Do You Need?

- •Do you need to identify the most inefficient facilities?
- •Do you need to measure energy savings from your energy conservation projects or from performance contracts?
- •Do you need to streamline your utility bill payment system?
- •Do you need to create an incentive system to encourage employees to save energy?
- •Do you need to verify that your utility bills are correct?
- •Do you need to allocate costs from master meters to submeters and subsidiary accounts?
- •Do you need to identify anomalous changes in utility usage?
- •Do you need to understand the relationship between production at your factory (or occupancy at your hotel, etc.) and utility usage?
- •Do you need to create budgets and track your utility costs against the budgeted costs?
- •Do you need to evaluate different rate structures on your utility data to find the best rate?
- •Do you need to have customized reports?

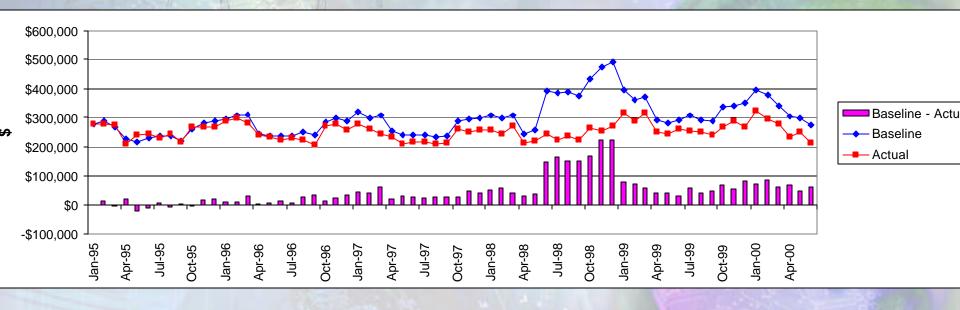


#### Do you need to identify the most inefficient facilities?



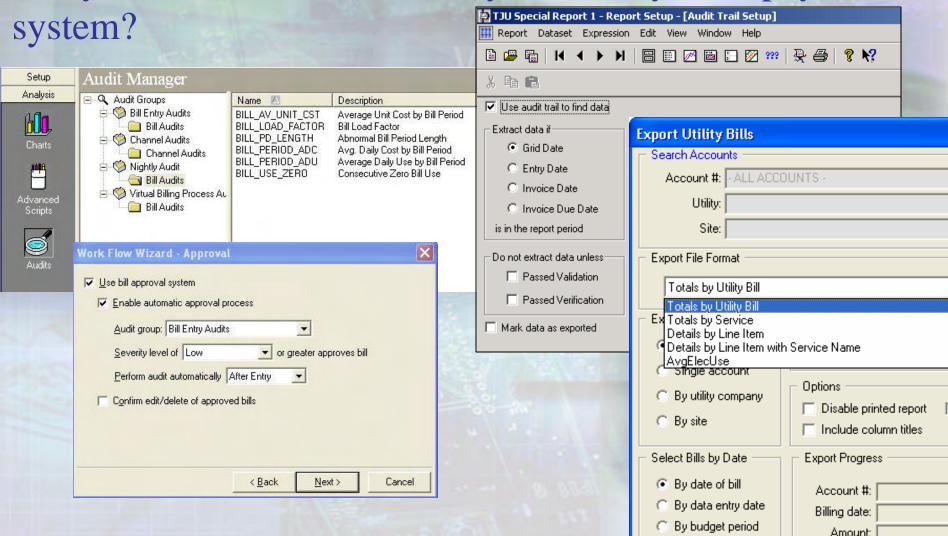


Do you need to measure energy savings from your energy conservation projects or from performance contracts?





Do you need to streamline your utility bill payment





Do you need to create an incentive system to encourage employees to save energy?

#### **Best Saving Sites**

BASELINE is the calculated total usage for the year based upon historic utility bill patterns. ACTUAL is the actual total usage for the year directly from utility bills. ACTUAL SAVINGS are Baseline less Actual usage. Positive Actual Savings mean utility usages have been reduced after correcting for weather and other variables.

This Summary shows the actual utility usage savings for the specified years.

#### Roman Provincial Stadiums

09/21/04

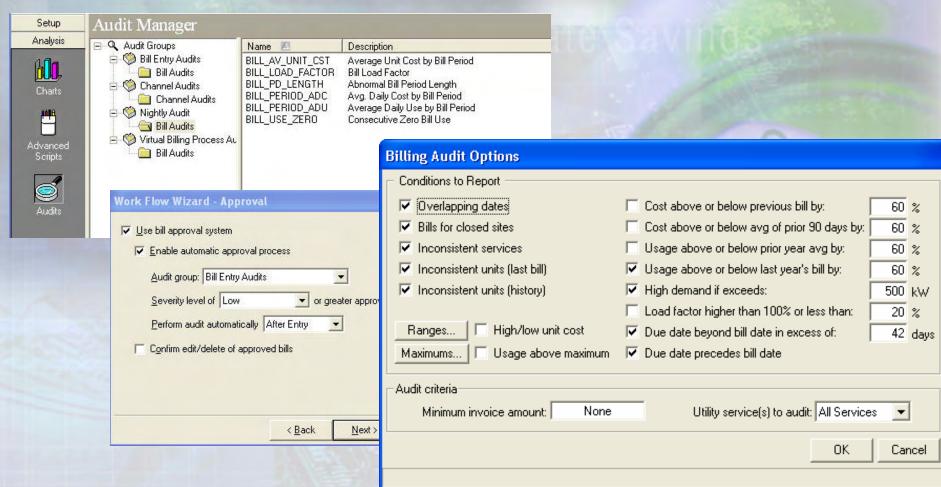
Year ending 6/30/03	Baseline	Actual	Actual Savgs
Numidia Total \$:	45,974	-39,845	6,129
Aegyptus Total \$:	40,416	-35,737	4,679
Achaea Total \$:	38,290	-34,566	3,724
Cyrenaica Total \$:	45,684	-42,387	3,297
Thrace Total \$:	44,551	-41,743	2,808
Britannia Total \$:	35,908	-33,542	2,366
Dalmatia Total \$:	38,007	-35,730	2,277
Bithynia et Pontus Total \$:	156,747	-156,691	56
Arabia Nabataea Total \$:	38,745	-38,836	-91
Cappadocia Total \$:	35,880	-36,636	-756
Germania Total \$:	193,313	-208,259	-14,946
Belgica Total \$:	174,447	-193,762	-19,315

#### School District #11, Bldg Type: Elementary Utility Cost and Savings Summary -- Year Ending 12/

	Julia	000.	and daving	Tillgo	Gaiiiii	A. y	rour Endi	g
	Monthly Electricity		Monthly Fossil Fuels		Other Utilities		Monthly Savings	Monthly Savings
Site	Cost	% Chg	Cost	% Chg	Cost	% Chg	(Energy)	(Other)
Scott, Vera Elementary	\$2,521	-4.0%	\$1,970	+5.0%	\$199		\$1,012	\$0
Adams Elementary	\$1,629	+5.3%	\$2,077	+23.0%	\$151	-59.1%	\$433	\$329
Trailblazer Elementary	\$2,715	+28.4%	\$2,305	+28.0%	(\$524)	-568.7%	\$487	\$636
Carver Elementary	\$2,487	+6.6%	\$1,677	-35.7%	\$168	+18.4%	\$1,327	(\$16)
Wilson Elementary	\$1,566	-47.4%	\$1,779	+3.3%	\$163	-46.9%	\$1,194	\$157
Keller Elementary	\$1,989	+10.2%	\$1,372	-10.1%	\$159	-6.3%	\$676	\$21
Twain Elementary	\$1,635	+9.5%	\$2,583	+51.1%	\$223		\$264	(\$180)
Jefferson Elementary	\$1,156	+21.5%	\$2,184		\$181	+37.3%	(\$11)	\$5
Monroe Elementary	\$1,426	-25.6%	\$2,709	+5.8%	\$196	+21.7%	\$1,009	(\$35)
Chipeta Elementary	\$3,434	+56.9%	\$2,716	+92.4%	\$69	-8.1%	\$39	\$6
Grant Elementary	\$2,159	-3.8%	\$4,003	+57.8%	\$178	+42.1%	\$389	(\$43)
Midland Elementary	\$1,012	+29.4%	\$969	-22.0%	\$96	+58.8%	\$284	(\$36)
Steele Elementary	\$1,559	+2.4%	\$1,646	+39.1%	\$112	+10.4%	\$206	(\$11)
Audubon Elementary	\$1,202	+5.4%	\$1,965	+10.8%	\$135	+162.7%	\$439	(\$83)
Whittier Elementary	\$883	+48.3%	\$1,492	+8.8%	\$86	N/A	\$425	\$0
Longfellow Elementary	\$1,189	+15.3%	\$3,128	+81.1%	\$141	-8.9%	\$64	\$14
Jackson Elementary	\$1,669	+28.4%	\$1,723	+39.1%	\$203	+88.7%	\$86	(\$87)
Pike Elementary	\$758	-3.6%	\$1,395	+5.9%	\$110	+22.8%	\$421	(\$20)
Q. Palmer Elementary	\$1,432	+35.9%	\$2,776	+65.7%	\$212	+28.5%	(\$99)	(\$47)
Edison Elementary	\$1,080	+18.6%	\$2,102	+68.7%	\$107	+18.7%	(\$117)	(\$17
Columbia Elementary	\$1,502	+27.9%	\$1,544	+95.4%	\$72	-36.3%	(\$176)	\$41
Lincoln Elementary	\$1,331	+23.4%	\$3.072	+78.6%	\$172	+58.0%	\$73	(\$63)
Stratton Elementary	\$1,183	+37.7%	\$2,304	+60.6%	\$10	-49.3%	(\$33)	\$0
Penrose Elementary	\$2.019	+19.1%	\$1,142	+41.3%	\$228	+55.7%	\$222	(\$72)
Fremont Elementary	\$1,710	+29.0%	\$1,142	+93.7%	\$156	+11.4%	\$4	(\$7)
Howbert Elementary	\$1,022	+38.0%	\$1,868	+63.2%	\$91	+81.9%	(\$87)	(\$41)
Taylor Elementary	\$961	+38.6%	\$3.565	+149.6%	\$114	+74.3%	(\$493)	(\$48
Washington Elementary	\$1,124	-3.2%	\$1,094	+2.9%	\$50	-51.1%	\$428	\$52
King Elementary	\$1,882	+21.6%	\$2.082	+32.5%	\$128	-5.8%	\$168	\$8
Buena Vista Elementary			\$2,082	+32.5%	\$128	+13.8%	\$108	(\$14)
Hunt Elementary	\$1,102	-7.4%	\$3.752		\$200	+40.5%	(\$109)	(\$58
Rogers Elementary	\$1,320 \$1,398	+45.1%	\$3,752 \$2,335	+111.3%	\$200 \$80	-34.4%	(\$109)	(\$58 \$42
lvvwild Elementary		+45.1%	\$2,335	+69.2%	\$86	+34.7%	(\$261)	
	\$1,336 \$932	+92.2%		+69.2% +73.5%			(\$261) \$66	(\$22
Madison Elementary Rudy Elementary	\$932 \$1.487	+7.2%	\$1,805 \$2,371	+/3.5%	\$194 \$220	+115.6%	\$66 \$122	(\$104 (\$108
Bristol Elementary		+231.4%	\$1,616	+23.8%	\$138	N/A	(\$242)	\$0
Bates Elementary	\$1,233	+17.5%	\$1,965	+53.1%	\$160	+33.8%	\$153	(\$40
Henry Elementary	\$2,212	-6.8%	\$2,094	+175.9%	\$203	+71.9%	\$17	(\$73
Martinez Elementary	\$2,273	+30.3%	\$1,589	+41.2%	\$181	+14.7%	\$177	(\$23
Totals	\$61,126		\$82,066		\$4,966		\$8,538	\$61

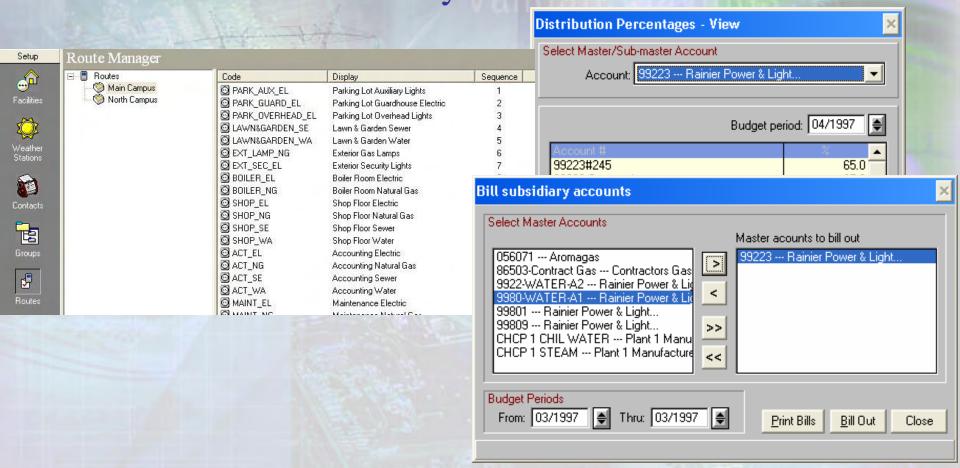


#### Do you need to verify that your utility bills are correct?



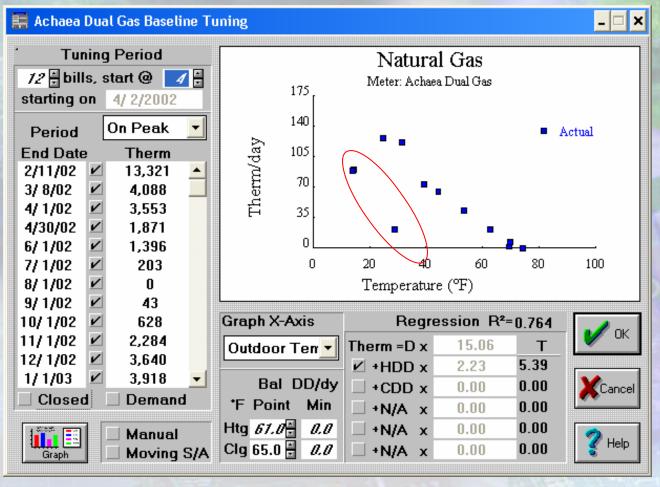


Do you need to allocate costs from master meters to submeters and subsidiary accounts?



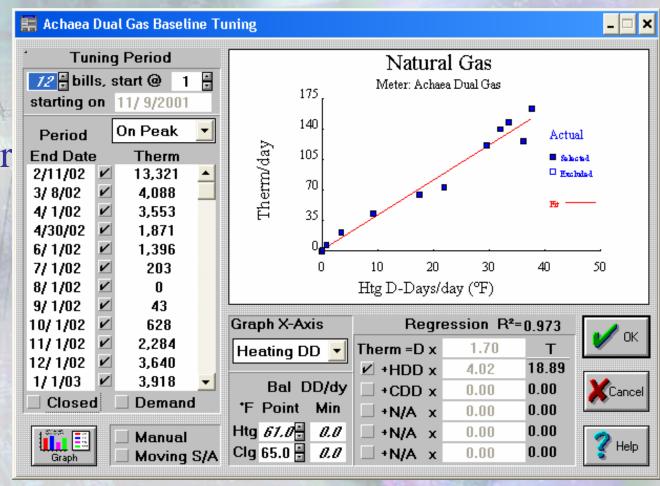


Do you need to identify anomalous changes in utility usage



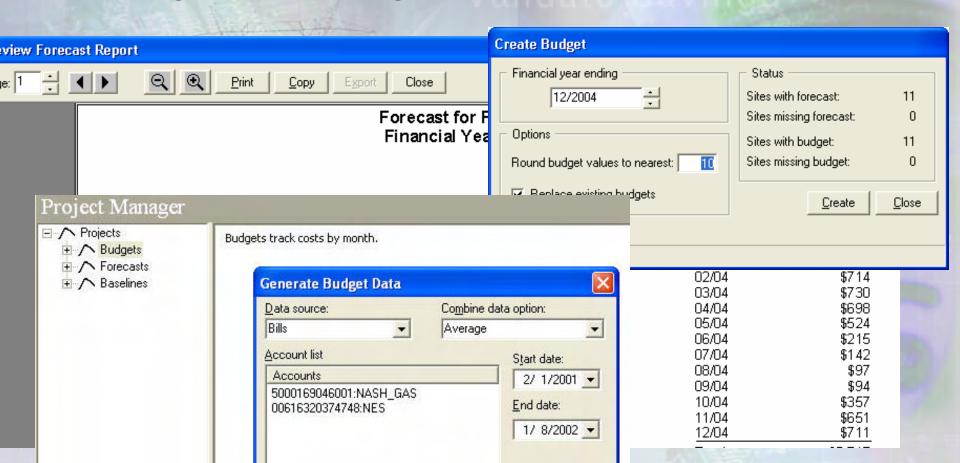


Do you need to understand the relationship between weather or widget production and utility usage?



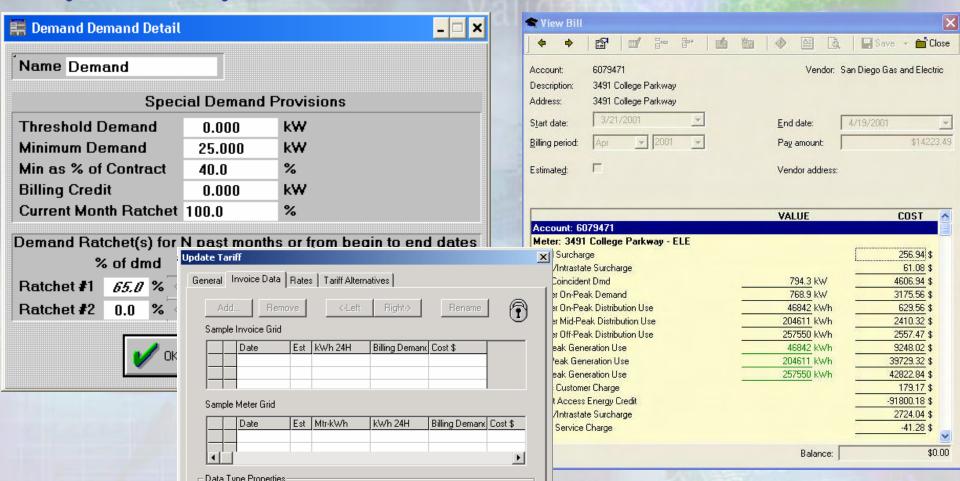


Do you need to create budgets and track your utility costs against the budgeted costs?



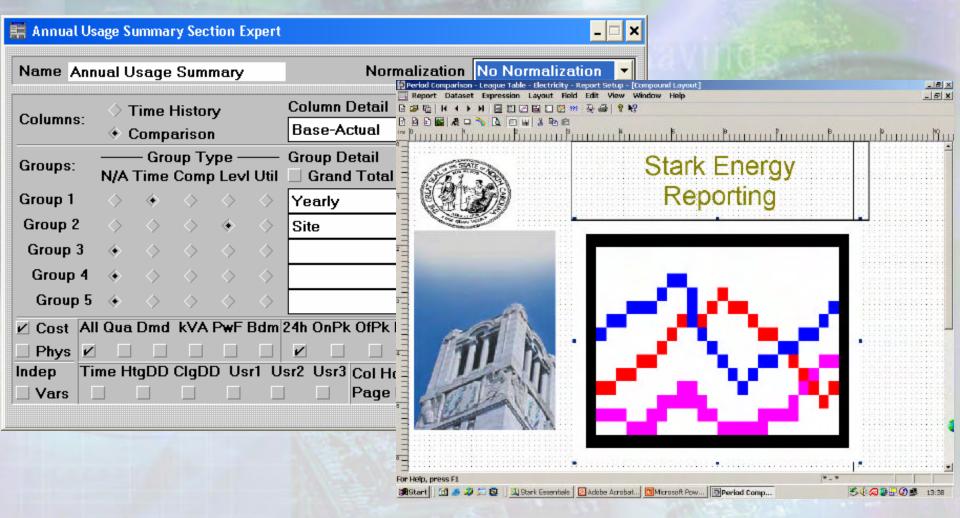


Do you need to evaluate different rate structures on your utility data to find the best rate?





#### Do you need to customize your reports?





## Selecting the Right Software

Before Purchasing Software, Answer these questions:



- What do you want the software to do?
- Who is going to use it?
- How much is your budget?



### **Energy Cap**

Made by makers of Faser
Web or desktop software
Primarily an accounting program for large
enterprises

Cuts costs associated with processing and paying utility bills

Can integrate utility bills with interval data Extensive bill auditing feature Script based rate engine can model ALL rates







Most analytical program
Best suited for M&V, corrects for changes in
weather or other variables
Baseline vs Actual or year to year comparison
Detailed Rate Engine
Allows Baseline Modifications
All Reports in Excel





#### Stark Essentials

Fully configurable to do almost anything
Detailed rate engine
Import interval data, and compare to utility
bills

Allocate costs from master meters to submeters

Customizable reports

Configurable export and import

Configurable export and import formats





### **Utility Manager Pro**

Easiest to use interface
Beautiful reports
Budgeting and forecasting
Custom import formats possible
Compares usage primarily year over year
Batch import feature
Now has Cost Avoidance

**Utility Manager Pro** 



### Conclusions on Selecting the Righ Utility Bill Tracking Software



- All the packages are good at what they do.
- You need to determine what tasks you need to accomplish with your software
- You must also consider your budget and personnel constraints



### Succeed with Your Bill Tracking

Be sure your people have enough time to track your bills.

Don't just buy software. Buy a relationship.

Have someone else put your database together.

Be sure your people know how to use the system.



#### **Contact Information**

Abraxas Energy Consulting sells and support several different utility bill tracking programs. We set up utility bill tracking databases, and teach our customers how to get the most out of their software.

John Avina Director Abraxas Energy Consulting

(805) 438-4847 johnavina@abraxasenergy.com

# OEMC Energy Management Training for K-12 Schools

November 30, 2006

#### Energy Management

Presented by:

Jim Faes, CEM & Tom MacDonnell, CEM

Jeffco Schools

#### Why Use Utility Tracking Software:

- "You can't manage what you don't measure".
- Accurate database of all current and historic utility bills.
- Provides an accurate analysis of current to baseline bill.
- Accounts for changes in weather, billing period, rates, square footage and mechanical systems.

#### Energy Accounting System

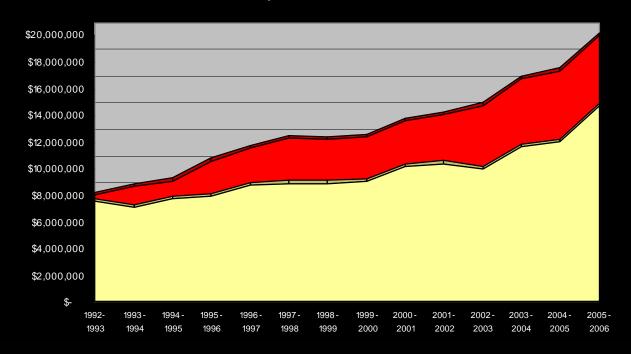
- First line defense for out of tolerance utility costs
- Compares current consumption and utility expenses to base year
- Produce an effective reporting system
- Develop an accountability system for energy consumption throughout the district.
- Products
  - EPA Portfolio Manager free!!! https://www.energystar.gov/index.cfm?c=k12\_schools.bus\_schoolsk12
  - Utility Manager
  - Metrix

# Billing Errors

- Estimated readings
- Taxes
- Rates
- ☐ Is it an error or mechanical problem?

#### Cost Avoidance

#### Jeffco Schools Projected v. Actual Costs

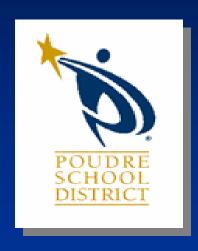


# Questions

# Comments

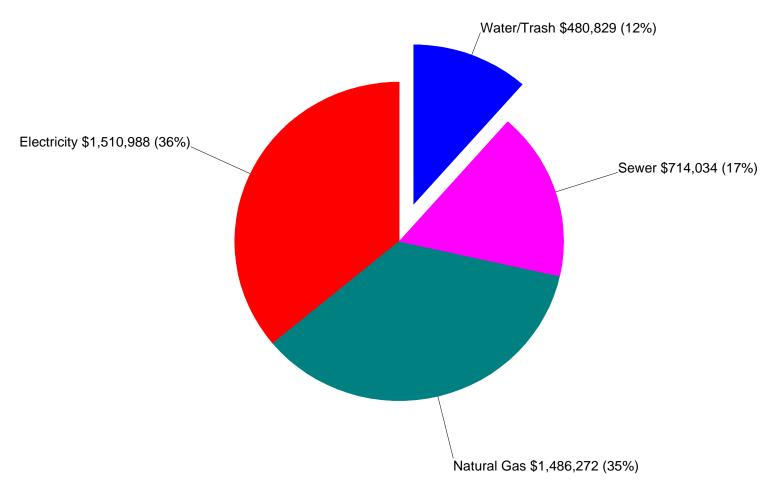
## Thank You!!!

### Utility Tracking and Bill Analysis



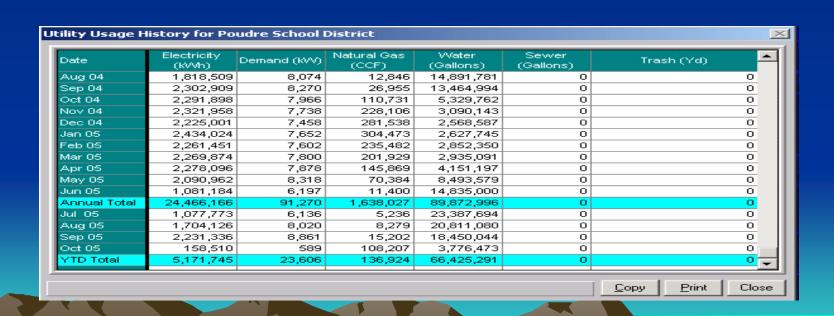
November 30, 2006

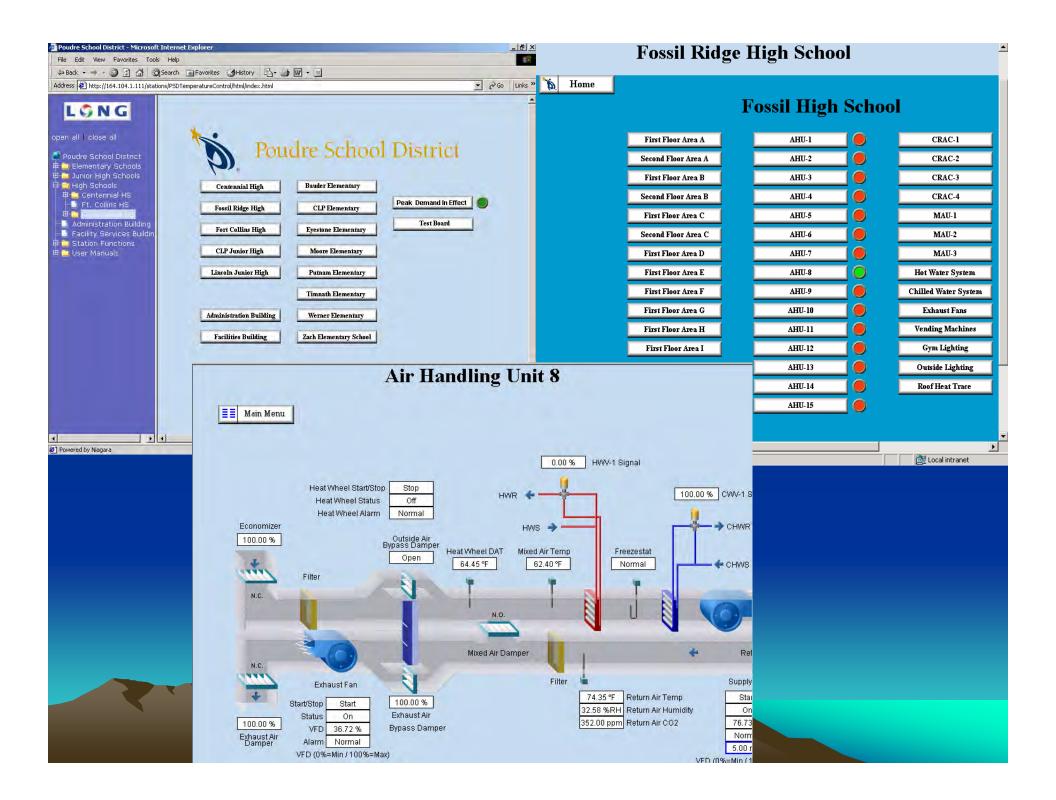
#### Annual Total Utility Cost Breakdown Poudre School District

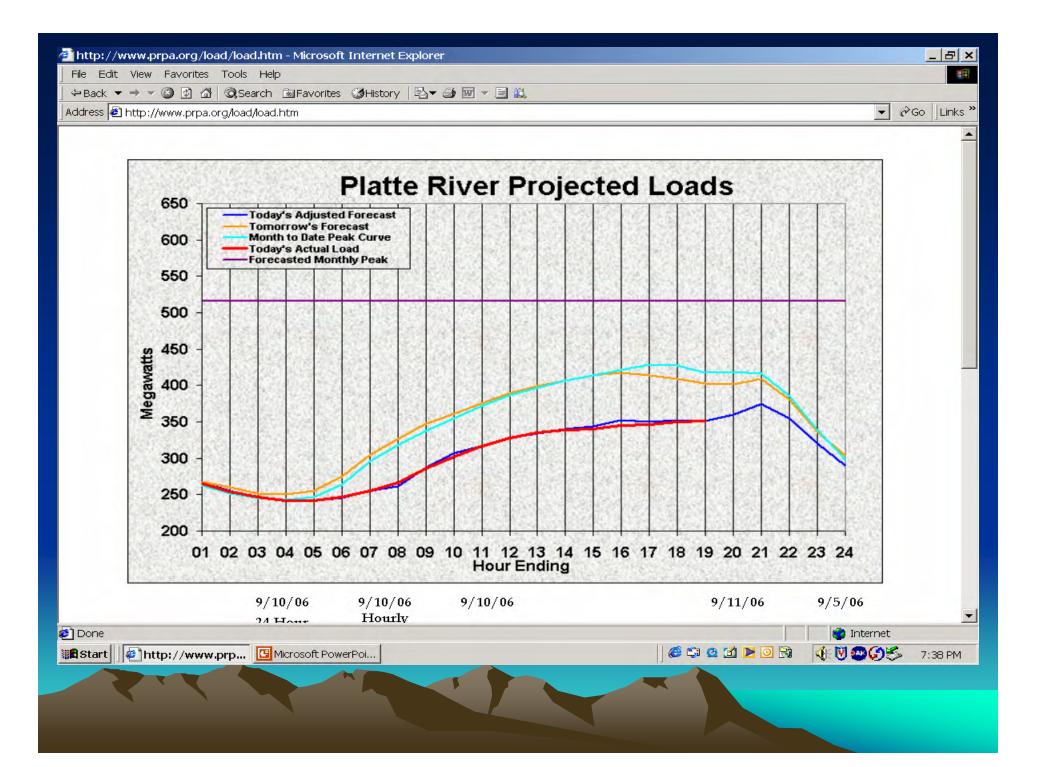


\$4,192,123 --- Total Utility Bill for Year Ending August, 2006

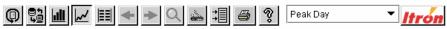
Date	Total Elec Cost	Natural Gas Cost	Water Cost	Sewer Cost	Trash Cost	Total Cost	Recycling Revenue
Aug 04	\$99,482.29	\$17,134.66	\$38,817.49	\$57,186.10	\$10,555.97	\$223,176.52	\$6,171.25
Sep 04	\$131,078.46	\$23,383.15	\$35,898.96	\$58,375.50	\$9,401.10	\$258,137.17	\$9,815.75
Oct 04	\$125,138.38	\$77,296.97	\$20,297.05	\$61,094.15	\$10,695.35	\$294,521.90	\$6,879.50
Nov 04	\$126,123.53	\$150,195.78	\$13,632.90	\$58,590.28	\$9,845.55	\$358,388.05	\$4,253.18
Dec 04	\$115,180.51	\$184,196.88	\$13,853.47	\$57,764.66	\$9,113.65	\$380,109.17	\$4,074.57
Jan 05	\$136,754.56	\$196,857.16	\$11,381.37	\$58,498.63	\$9,472.19	\$412,963.91	\$4,253.75
Feb 05	\$129,073.47	\$155,956.77	\$11,758.45	\$57,464.39	\$9,460.95	\$363,714.03	\$3,756.00
Mar 05	\$117,402.14	\$133,073.78	\$12,582.35	\$63,280.47	\$9,244.68	\$335,583.43	\$4,198.50
Apr 05	\$125,780.66	\$98,861.32	\$15,829.59	\$60,697.26	\$9,582.50	\$310,751.33	\$4,101.50
May 05	\$126,121.01	\$52,867.16	\$27,534.07	\$60,540.91	\$9,864.72	\$276,927.87	\$3,674.75
Jun 05	\$76,791.22	\$17,223.89	\$40,719.75	\$57,897.07	\$9,322.65	\$201,954.58	\$4,841.75
Annual Total	(1,385,224.33	1,121,771.17	\$280,349.30	\$708,780.21	\$117,092.57	3,613,217.61	\$60,052.15
Jul 05	\$74,341.38	\$13,747.93	\$58,078.67	\$58,476.70	\$532.70	\$205,177.38	\$2,055.75
Aug 05	\$103,202.18	\$15,984.95	\$52,269.32	\$58,908.86	\$8,299.59	\$238,664.88	\$4,297.50
Sep 05	\$170,419.59	\$19,865.74	\$47,735.45	\$55,748.97	\$11,620.86	\$305,390.61	\$6,078.00
Oct 05	\$16,053.64	\$76,132.53	\$12,029.36	\$14,749.88	\$4,804.16	\$123,769.57	\$5,776.80
YTD Total	\$364,016.79	\$125,731.15	\$170,112.80	\$187,884.41	\$25,257.31	\$873,002.44	\$18,208.05











#### Please select a Meter, Quantity, and Date range

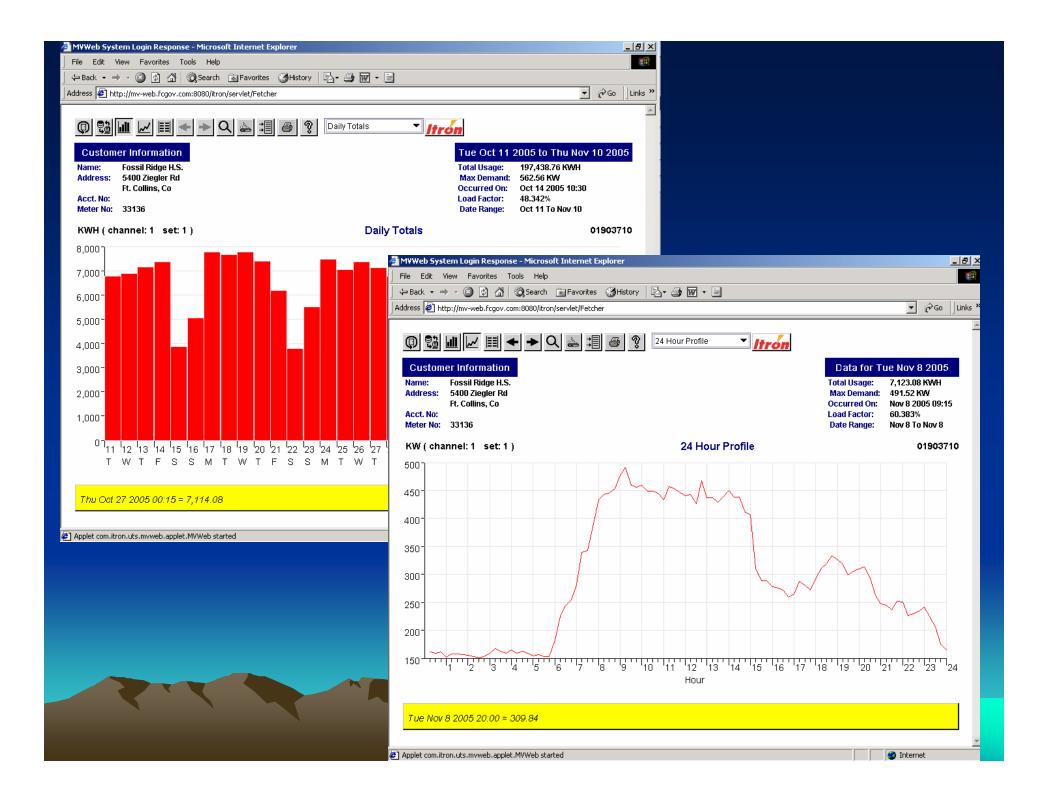
Meter ID							
Meter ID	Customer						
01901000	PSD Ft. Collins High	•					
01903000	PSD Boltz Jr. High						
01903100	PSD Administration						
01903150	PSD Admin outbuildng						
01903175	PSD FACILITIES						
01903185	Bacon Elem. (P.S.D.)						
01903200	PSD Bauder Elementar						
01903300	PSD Beattie Elementa						
01903400	PSD Bennet Elementry						
01903500	PSD Blevins Jr. High						
01903550	BOYS AND GIRLS CLUB						
01903575	Centennial H.S.						
01903600	PSD Dunn Elementary						
01903710	Fossil Ridge H.S.						
01903750	P.S.D. FULLANA						
01903800	P.S.D. IRISH ELEM						
01903900	PSD Johnson Elementa						
01903950	P.S.D Zach Elem.						
01904000	PSD Kruse Elementary						
01904050	P.S.D. HARRIS						
01904100	PSD Laurel Elementry						
01904200	PSD Lesher Jr. High						
01904250	Lincoln Jr. High	•					

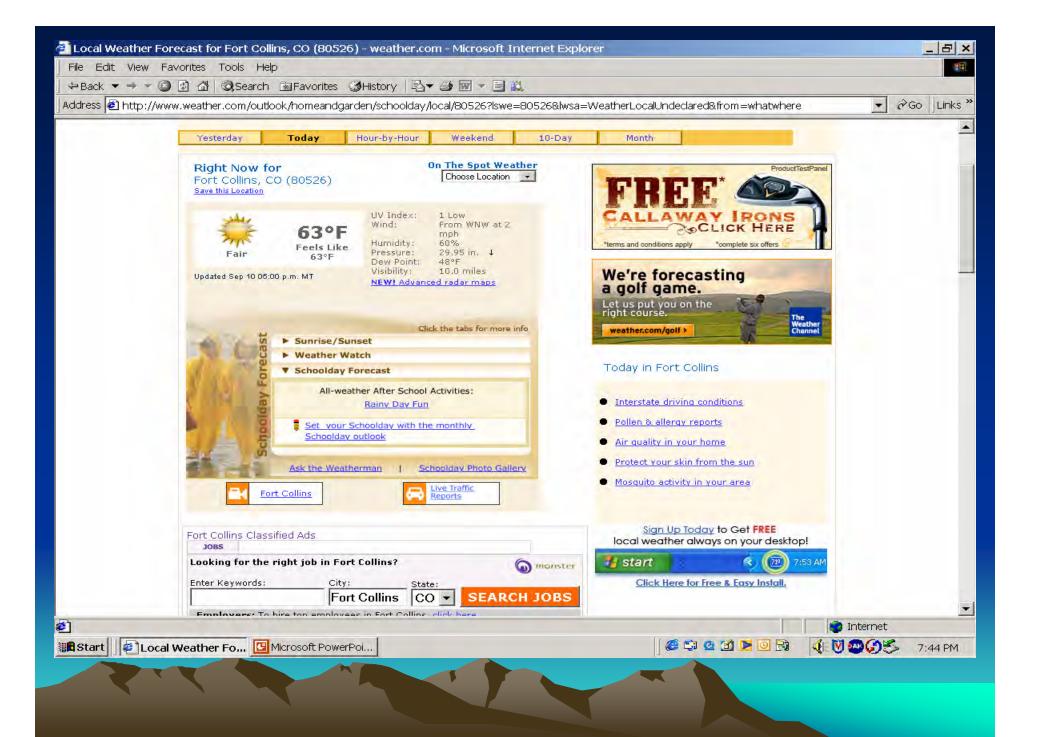
| Channel | Set | Acct. No | Meter No | | Acct. No | Meter No | | Acct. No | Meter No | Acct. No | Acct. No | Meter No | Acct. No |

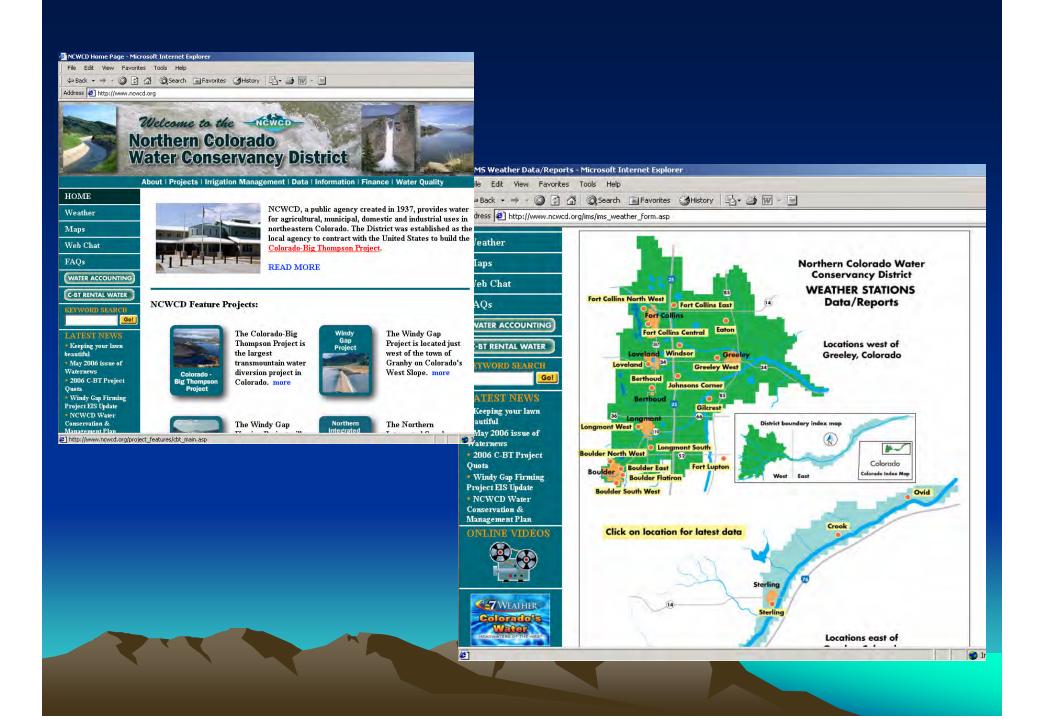
**Start Date**: 12/01/1999 ▼ **End Date**: 12/30/2000 ▼

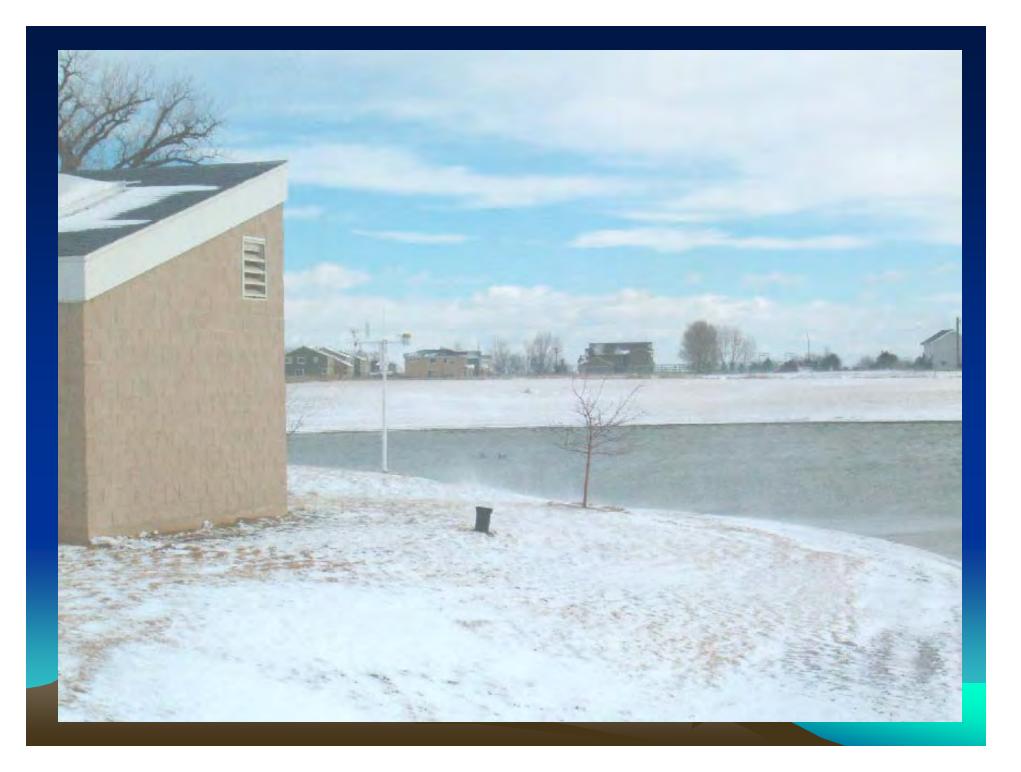
Interval ▼ Data for this channel is available from No Data to No Data

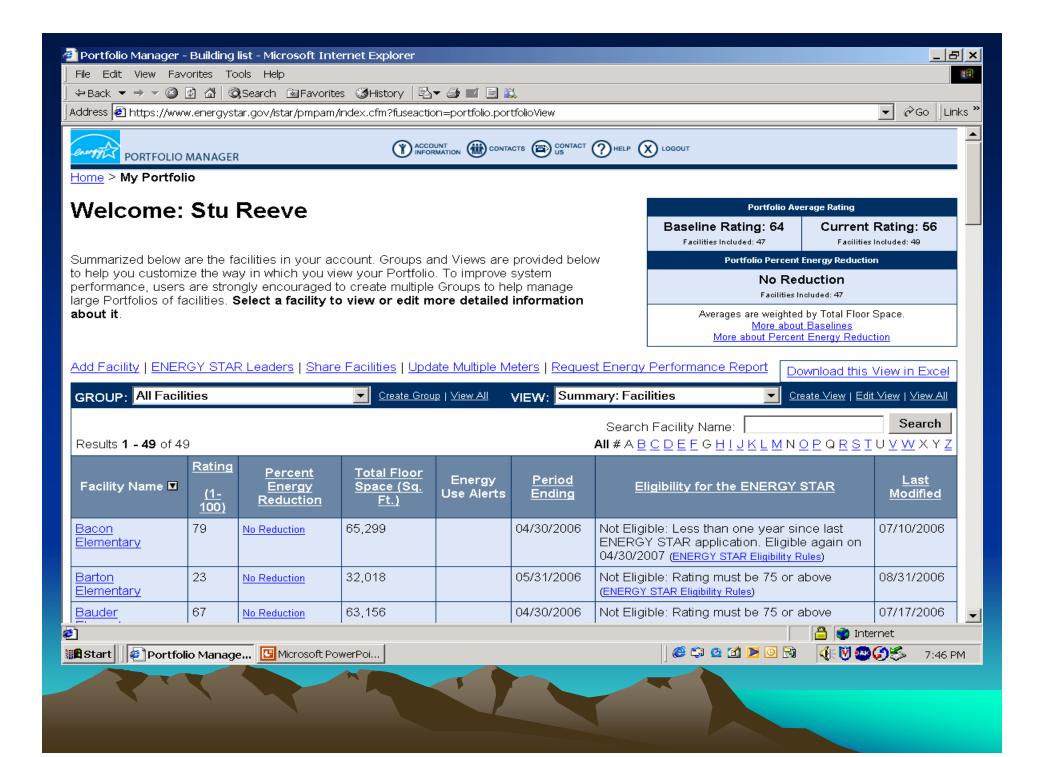
Show Report









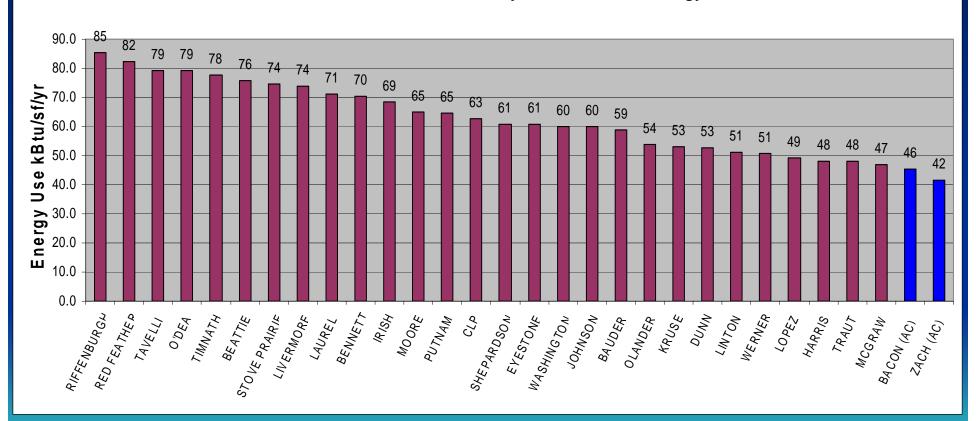


## Energy Conversions

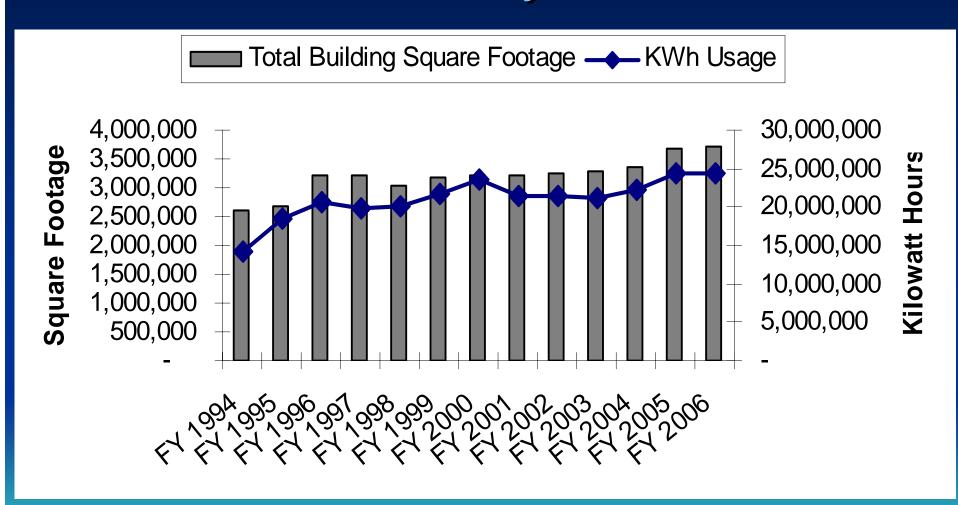
- 1 kWh = 3412 Btu
- 1 cf NG = 1000 Btu
- 1 Ccf NG = 100,000 Btu
- 1 Therm NG = 100,000 Btu
- 1 Mcf/Dth NG = 1,000,000 Btu
- 1 gal. Propane = 95,000 Btu

#### kBtu/Sq.Ft./Yr.

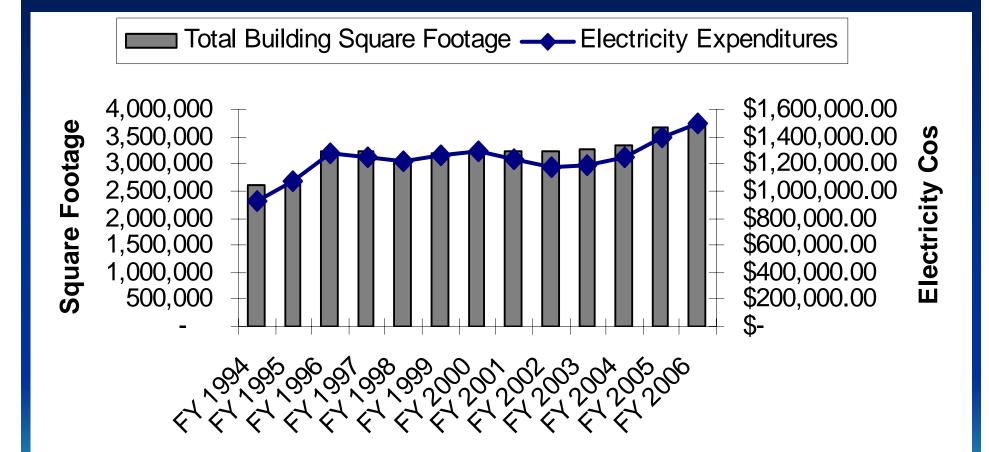


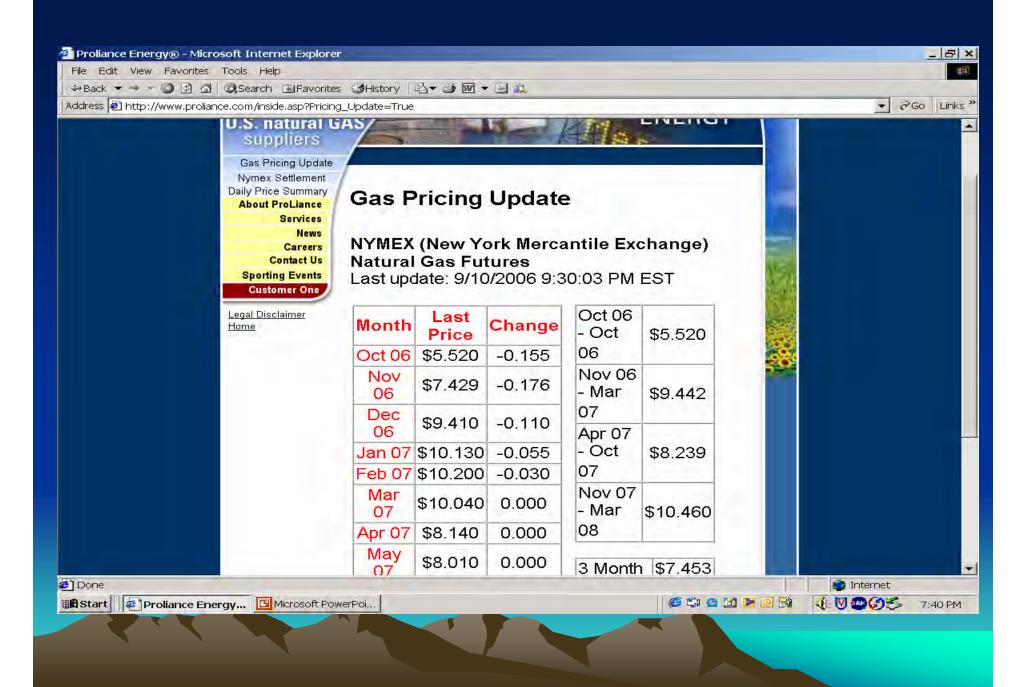


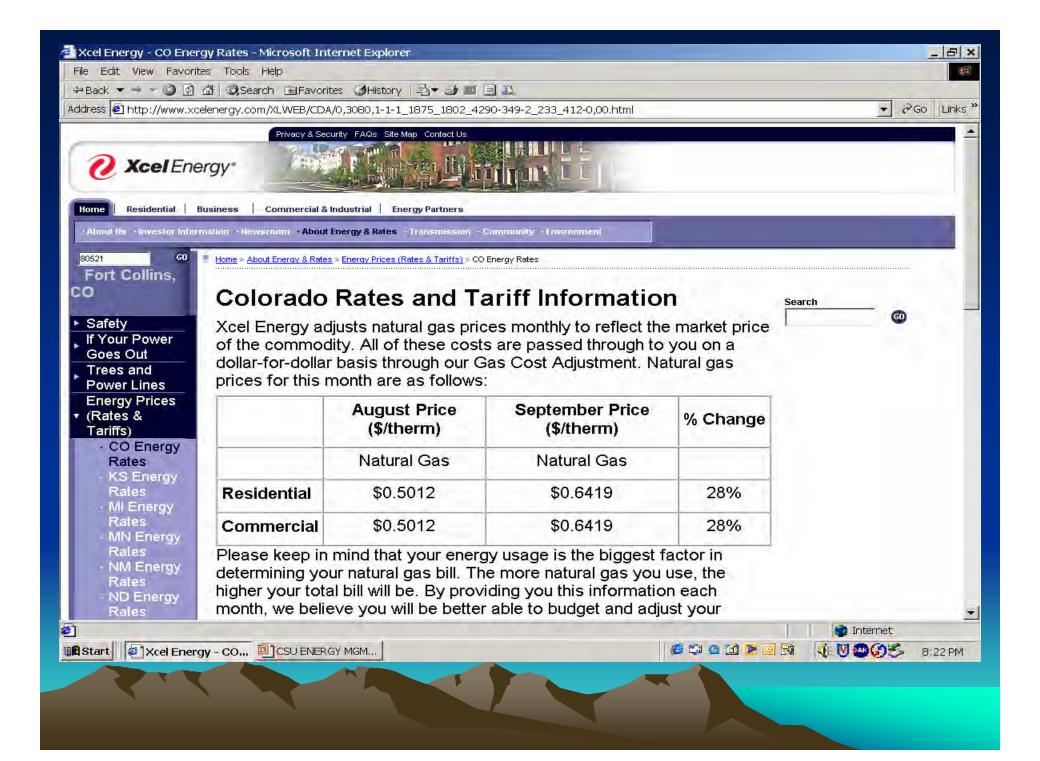
#### Electricity Use

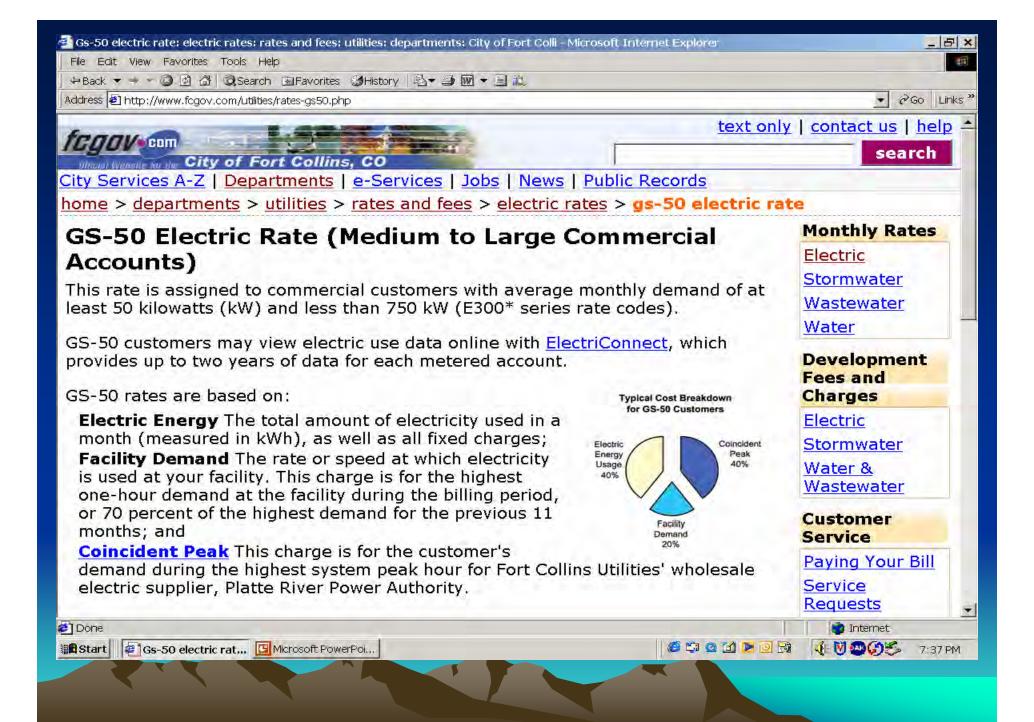


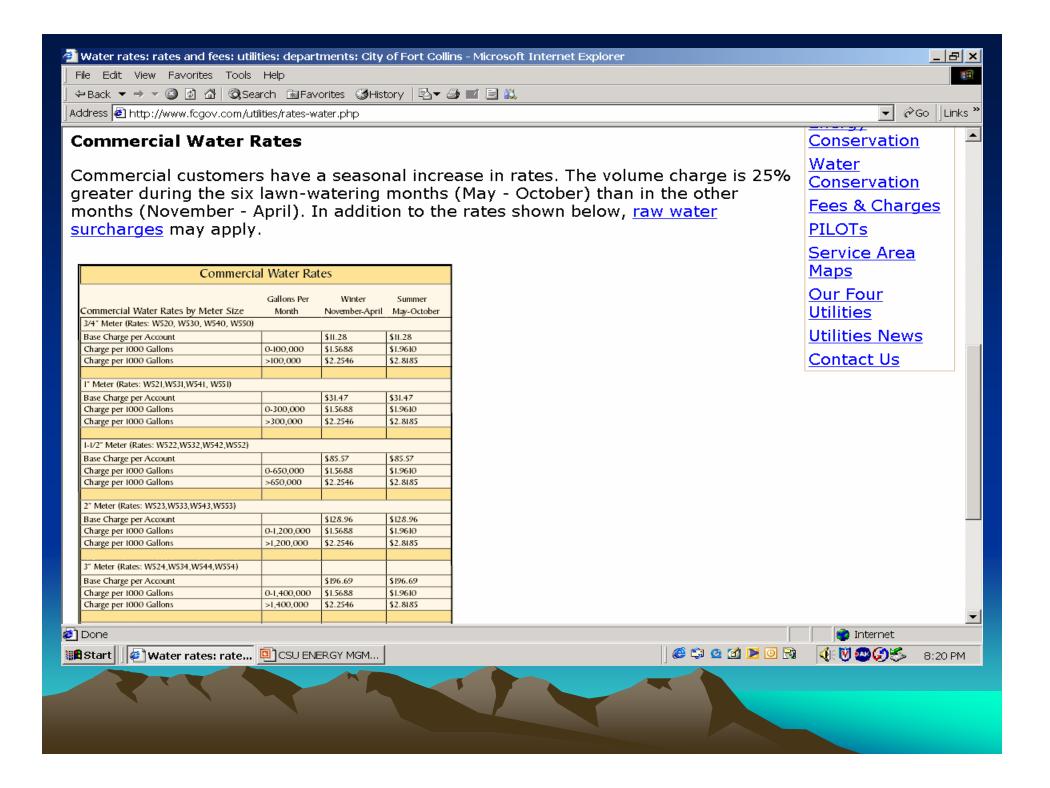
#### Electric Cost



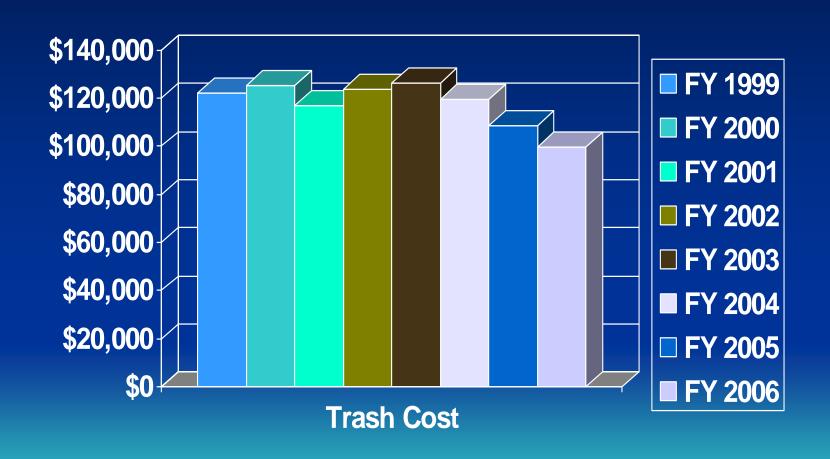




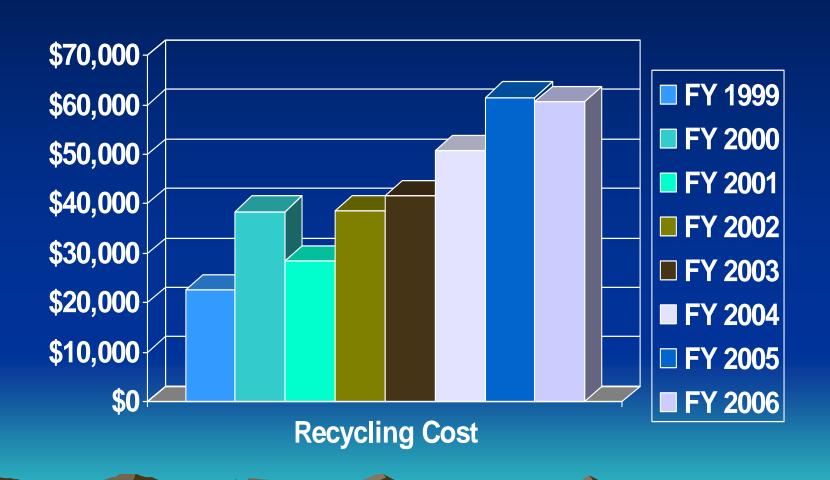




#### Trash Costs



## Recycling Costs

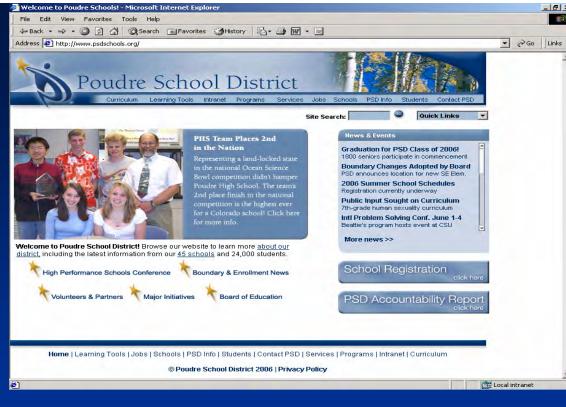




#### Stu Reeve

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stur@psdschools.org



www.psdschools.org